

january
1957

MACHINE AND TOOL

blue book

An INSIDE REPORT ON:

ALSO featured:

Routing Wing Skins
at Boeing

Ceramic Tooling
at Ford

Parts Obsolescence
at Kaiser

German Production Methods



a hitchcock
publication

... A CHALLENGE?

HITCHCOCK'S EDITORIAL DIRECTOR, WM. SCHLEICHER, just returned from an extensive tour of industrial Germany with this exclusive account.

CONTENTS ON PAGES 5 AND 6

For...

General-Purpose Sawing
with
High Speed
Accuracy, Economy



Model 4B/M2/E2
Equipped with standard
work track
(Optional Equipment).

Let us prove to you the many reasons why this MARVEL Hack Saw offers the cheapest, most accurate and fastest "cut-off" method available to you at a low initial cost.

Ask your dealer, or write us for Bulletin GP35 which fully describes and illustrates the many exclusive features which makes this Hack Saw Machine your "best buy".

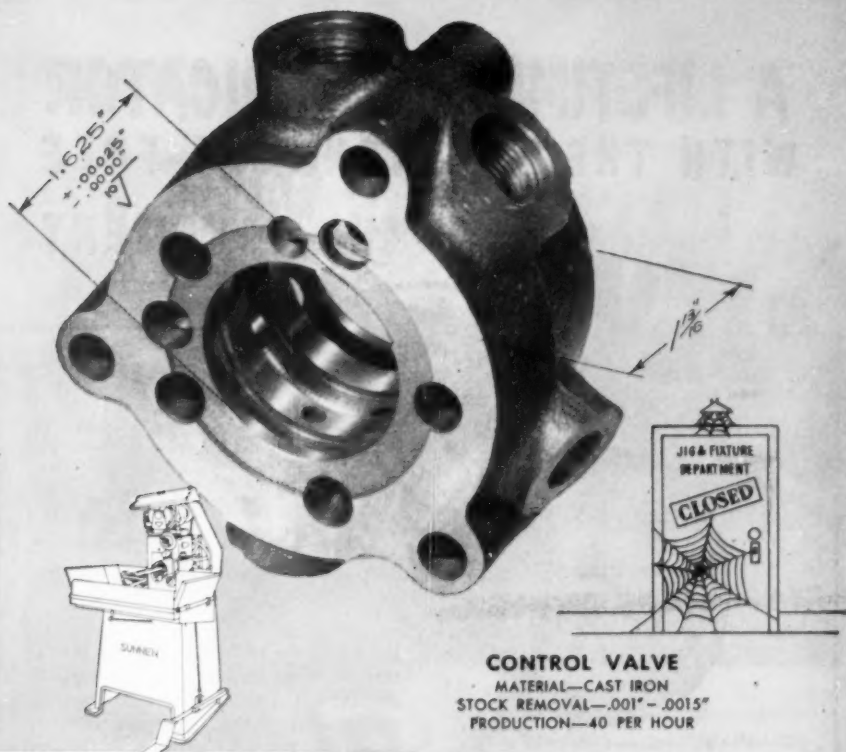
MARVEL No. 4B
HIGH SPEED HACK SAW

Exclusive features

1. Horizontal Ball Bearing Saw Frame.
2. Screw Feed—Automatic or Hand Driven.
3. Quick Return Stroke—allows greater number of strokes per minute.
4. Simple Positive Coolant System.
5. Adjustable Stroke—can be shortened for larger capacity.
6. Speed Range—available in 1, 2 or 4 speed models for wider range of work.



ARMSTRONG BLUM MFG. CO. • 5700 Bloomingdale Ave. • Chicago 39, Ill.



CONTROL VALVE
 MATERIAL—CAST IRON
 STOCK REMOVAL—.001" —.0015"
 PRODUCTION—40 PER HOUR

GET DISTORTION-FREE BORES WITH FIXTURE-FREE HONING

With Sunnen Honing as your final bore-sizing process . . . the workpiece is free and uncramped. No holding fixtures are used! The finished bore will not change shape—immediately or later—as there is no stress to relieve. Savings are substantial—no fixture cost, no set-up time, no loading or unloading.

Sunnen Honing gives you perfect control of stock removal, size and finish at all times. Errors of previous hole machining operations are corrected once and for all.

With Sunnen Honing you're equipped to produce precision holes of nearly any diameter and length combination . . . in practically any shape part . . . small lots or production runs.

SEND
 FOR FIVE
 INFORMATIVE
 BOOKLETS



CHECK READER SERVICE CARD

SUNNEN
 PRODUCTS COMPANY
HONING
 7922-A Manchester Ave. • St. Louis 17, Mo.

GET ALL THE FACTS ON SUNNEN HONING

Use postpaid card. Circle No. 201

January, 1957

A LIFETIME DIAL INDICATOR WITH THE MAINTENANCE-FREE

"H" MOVEMENT

NEW



Rugged — shockproof — withstands more impact. Improved life under all conditions. All gears, racks, and pinions precision hardened — friction reduced 16% to 25%, depending upon magnification . . . a new high in sensitivity.

Calibrated accuracy greatly improved. Off-white dials and fine line graduations facilitate readings. Available in four sizes. Enthusiastically received in shop tests.

You can get the NEW FEDERAL Dial Indicator:

- In 47 Regular Models (any B, C, D, or E size model listed on page 4 of our catalog)
- In 7 Wetproof Models (all Wetproof Models listed on page 6 of catalog)
- In 2 Long Range Models (C81S and D81S, shown on page 7 of catalog)

To specify the new style Lifetime Dial Indicator, merely add "H" after Model Number desired. If you don't have the new Dial Indicator Catalog No. 55 and Price List, write today . . .

FEDERAL PRODUCTS CORPORATION
7251 Eddy St. • Providence 1, R. I.

Ask **FEDERAL** First

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic—for Inspecting, Measuring, Sorting, or Automation Gaging

FEDERAL'S SOLUTION
TO THE COST OF GAGING:
Impartial Gage Selection
Engineering Follow-Through
Everything in Gages

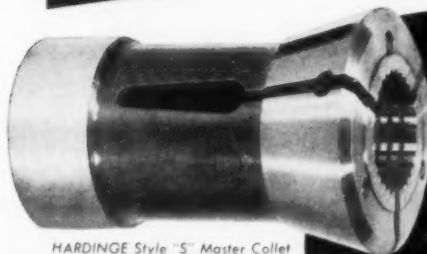
Use postpaid card. Circle No. 202

MACHINE and TOOL BLUE BOOK

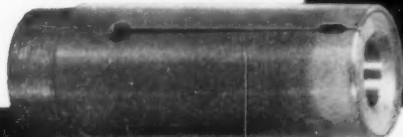
HARDINGE COLLETS and FEED FINGERS for Cone Automatics*

HARDINGE
ELMIRA, N.Y.

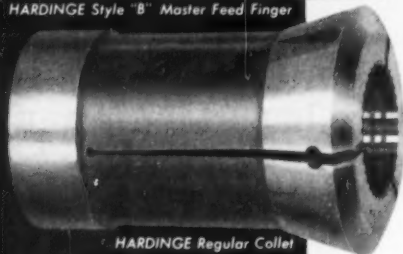
- Low Tooling Cost
- More Efficient Production



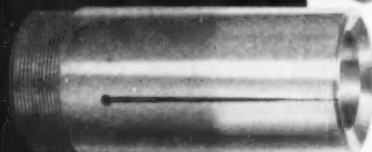
HARDINGE Style "S" Master Collet



HARDINGE Style "B" Master Feed Finger



HARDINGE Regular Collet

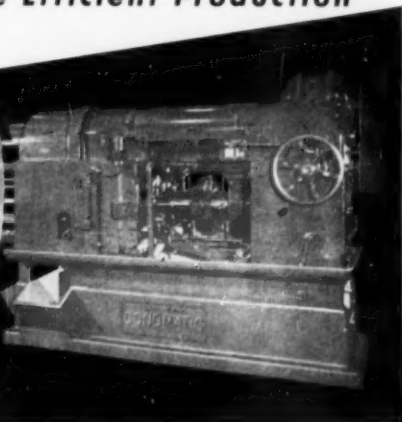


HARDINGE Regular Feed Finger



**Immediate
Stock Delivery**

from Hartford
New York Philadelphia
Dayton Chicago
Minneapolis St. Louis
Detroit San Francisco
Los Angeles Elmira



Maximum production at lowest cost is assured when you specify HARDINGE Collets and Feed Fingers

Hardinge Master Collets and Master Feed Fingers feature low-cost replaceable pads that are interchangeable among different makes of automatics with the same capacity.

Hardinge Masters give true solid collet and feed finger performance.

Hardinge Regular Collets and Feed Fingers are precision made, hardened and ground internally and externally, and bring you the benefit of 62 years of engineering and manufacturing experience.

* Also available for the following automatics:
Greenlee, Gridley and Acme Gridley, National Acme, New Britain

**Hardinge is your one source of supply
for all collets and feed fingers.**

**HARDINGE BROTHERS, INC.
ELMIRA, N. Y.**

ARMSTRONG



The ARMSTRONG Threading Tool takes interchangeable high speed steel form-cutters which require only flat top grinding to resharpen—always hold their true thread form.

Write for
catalog

Each year ARMSTRONG TOOL HOLDERS become more important to you

Every rise in labor costs, every added tax, every overhead burden, every increase in cutting steel prices, every new, more costly machine tool, all increase the importance of ARMSTRONG TOOL HOLDERS to profitable operation.

ARMSTRONG TOOL HOLDERS reduce direct tooling costs to an absolute minimum—"Saves: All Forging, 70% Grinding, 90% High Speed Steel."

ARMSTRONG TOOL HOLDERS reduce tooling-up time to minutes, to the selection and adjustment of the holder and cutter.

ARMSTRONG TOOL HOLDERS permit increased speeds and feeds—produce more pieces per hour per machine tool.

ARMSTRONG TOOL HOLDERS are efficient for they embody a perfection gained by over 50 years of specialization in the development and refinement of tool holders.

ARMSTRONG TOOL HOLDERS are inexpensive because they are quantity produced by modern methods, for a world market... are used by over 96% of the machine shops and tool rooms... are carried in stock for your convenience by all industrial distributors of consequence.

Buy
ARMSTRONG
TOOLS from your
Industrial Distributor

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"
3208 W. ARMSTRONG AVENUE CHICAGO 30, ILL.

Use postpaid card. Circle No. 404

MACHINE and TOOL BLUE BOOK

READER'S GUIDE

MACHINE AND TOOL

blue book

JANUARY, 1957

VOL. 52 - No 1

FEATURES THIS MONTH	79
LETTERS TO THE EDITOR	83
ROUNDUP OF WASHINGTON NEWS	87
AS THE EDITOR SEES IT	99

German Production

A first hand report of German Production Methods of Today. BY WILLIAM F. SCHLEICHER	103
---	-----

Inventory Control

Have a Parts Obsolescence Problem? Here's the lowdown on Kaiser Steel's dollar-wise pre- ventive Obsolescence program. BY JAMES JOSEPH	114
---	-----

Drilling

5½" Long Holes Drilled at 120 Pcs. per Hour Rate	126
---	-----

Automation

Processing Two Sets of Bearing Caps at Once	129
---	-----

Milling

Rolled Contoured Wing Skins with Finger Tip Controls BY EUGENE HARP	136
---	-----

Ceramic Tooling

How Ford Increased Production with Ceramic Tools	140
---	-----

Labor Relations

Right or Wrong in Labor Relations	145
-----------------------------------	-----



Accepted as Controlled Circulation Publication at Pontiac, Illinois
Copyrighted, 1956, by the Hitchcock Publishing Company,
222 E. Willow Avenue Wheaton, Ill.

**SEE
NEXT
PAGE**

Reader's Guide

continued

Shop Hints

- Die Cushions for Forming Dies155
Drill Jig for Straight and Angular Holes156
Faster Removal, Replacement of Chucks in Lathes 158

Field Reports

- Automating Standard Fixtures161
Production of Wire Forms Increased 74 Per Cent
with Flame Plating162
Production Doubled with Throw-Away Inserts ...166

Departments

- Meetings, Conventions, Exhibits 96
Right or Wrong in Labor Relations145
News of the Industry169
Free Literature185
What's New in Metalworking207
Mechanics Through the Ages316
The Market Place319
Products Index321
Index to Advertisers327

Editorial Staff

W. F. SCHLEICHER, vice-president and editorial director; P. A. MELINE, managing editor; D. M. CARLSON, assistant editor; E. McDANIEL, associate editor; W. W. BURTON, editorial assistant; RICHARD C. BUSH, editorial production manager, V. F. BOYER, Reader's service, H. O. ERICKSON, Research Manager.

Editorial Advisory Board

M. JOHN AHLSTROMER, asst. factory manager, Chicago Screw Co.; RONNIE BURRITT, factory manager, J. J. Tourek Mfg. Co.; JOHN V. CARLSON, gen'l. supt., Union Special Machinery Co.; R. T. CARLSON, supt. NRK Mfg. & Eng. Co.; ROGER FARDIG, Consulting Engineer; ED FLUSKEY, Consulting Engineer, Revere Camera Co.; HOMER F. GRIFFITH, asst. works mgr., Construction Equipment Div., International Harvester Co.; JOE KOSINSKI, works mgr., Scully-Jones & Co.; PAUL PRIKOS, vice pres., Prikos & Becker Tool Co.

Business Staff

R. C. VAN KAMPEN, president; VINCENT C. HOGREN, executive vice-president; HENRY J. SMITH, DAN E. REARDON, JAMES C. STEWART, vice-presidents; M. L. YONTS, production manager; OLIVER S. PEPPER, business mgr.; LOREN D. JOUETT, Director of Marketing; L. M. SCHROEDER, art director; R. L. SPRECKELS, circulation manager.

Hitchcock District Managers are Listed on Page 64.

MACHINE AND TOOL BLUE BOOK

Subscription rates: \$5.00 per year in U.S.A. \$6.00 per year elsewhere.

NO BLACK MAGIC OR "HOCUS-POCUS"

*We have
no Secrets!*



**...JUST THE BEST
DRILL BUSHINGS!**

With precision American drill bushings you get: the *best* tool steel for extra long bushing life; the *best* 100% concentricity inspection; the *best* ordering method — eliminates confusing code numbers; the *best* range of standard sizes — smallest to the largest; and the *best*, most complete local stocks anywhere. Because we specialize only in the manufacture of drill jig bushings, American is your *best* drill bushing buy!

Send for our new 1957 catalog, price lists, and name of exclusive distributor near you.

American

DRILL BUSHING CO.

5107 PACIFIC BOULEVARD

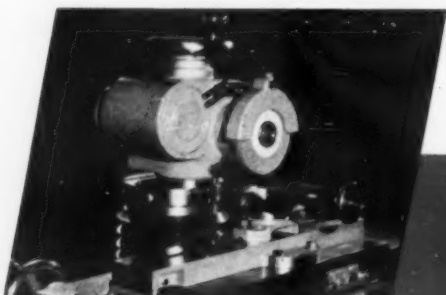
LOS ANGELES 58, CALIFORNIA



**GRIND LATHE
AND PLANNER TOOLS***



**SHARPEN SHELL
END MILL CUTTERS**



GRIND FLAT SURFACES†

*Surface Grinding Attachment. Extra equipment.

†Cylindrical Grinding Attachment required. Work is ground dry.

**CINCINNATI No. 1
CUTTER AND TOOL
GRINDER**
Catalog No. M-1852-1



CINCINNATI



**SHARPEN STAGGER
TOOTH CUTTERS**



**CYLINDRICAL
GRIND DIAMETERS†**

What You Can Do

No. 1 CUTTER AND TOOL GRINDERS

You can do a lot of fine work on CINCINNATI® No. 1 Cutter and Tool Grinders... the type of work that will help your production machines operate at higher efficiency. CINCINNATI No. 1's are designed to sharpen and recondition a variety of small- to medium-sized cutters; to sharpen them accurately, quickly, safely. The No. 1's are tops for the type of cutter and tool grinding operations shown here. Some of the reasons why include:

Anti-friction table slide

Cartridge type, preloaded anti-friction grinding wheel spindle mounting

Eccentric wheelhead swivel

Built-in reversible motor

... and a dozen additional reasons

Get a copy of the catalog covering these fine Cutter and Tool Grinders, and show it to your men who are responsible for this type of work. You can count on their opinion. Brief specifications will be found in Sweet's Machine Tool File, and complete data may be obtained by writing for catalog No. M-1852-1.

THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO

**MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES
HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS**

Use postpaid card. Circle No. 206

The TREE 2UV MILL

gives you these
features—

- Roller Drive
- One Clamp Turret Lock
- Automatic Collet Closer
- Built-in Power Feed
- Rapid Traverse
- Labor Saving Operator Controls

*plus
Versatility*

The TREE 2UV Vertical Mill combines rigidity and flexibility to make it one of the most versatile on the market today. The following features make it adaptable to a wide range of jobs:

- Fully universal milling head with power feed
- Dovetail type ram—360° movable turret
- Table — 10½" x 42" — power feed and rapid traverse
- Hardened and ground lead screws by Ex-Cell-O
- Ample range: 25" longitudinal, 11" transverse, 17½" vertical travel
- Weight—2400 lbs.

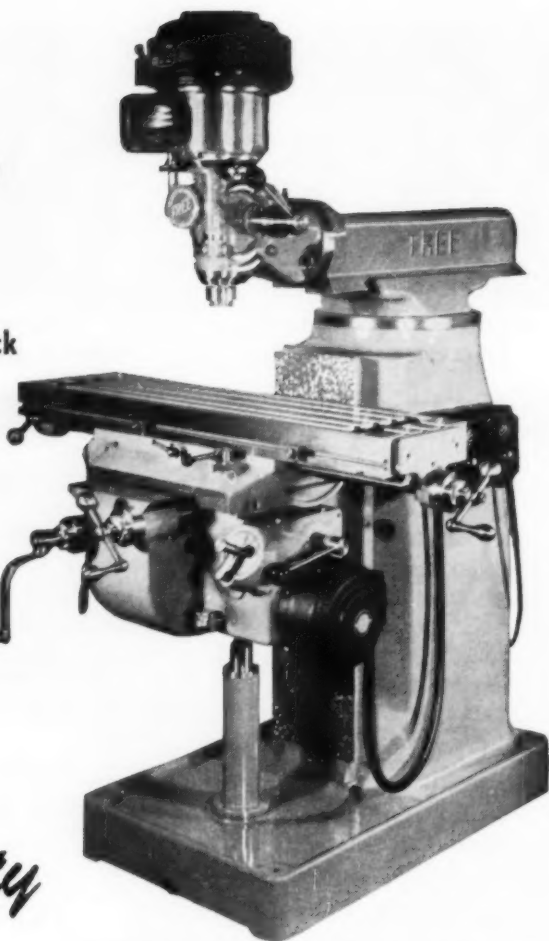
Write for complete information . . .

TREE TOOL AND DIE WORKS

1600 JUNCTION AVENUE

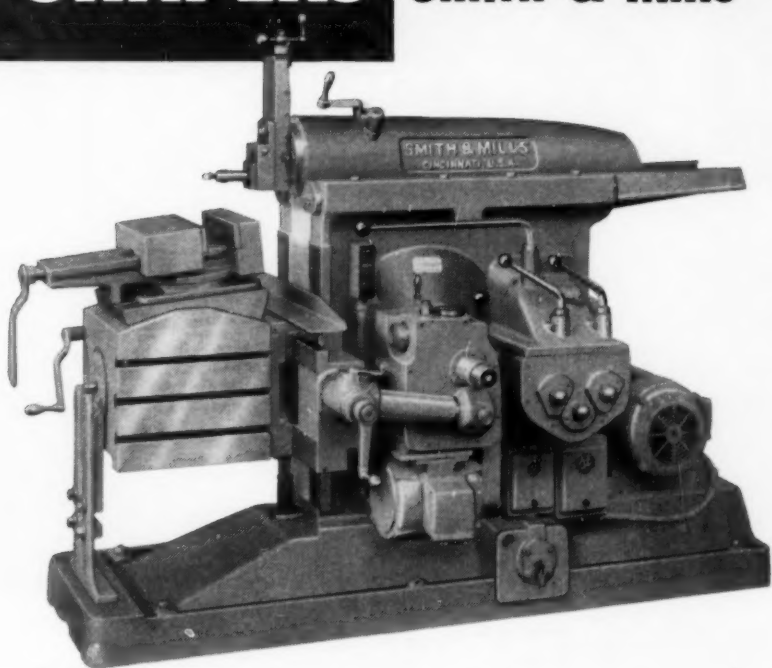
RACINE, WISCONSIN

Manufacturers of—MH-4 UNIVERSAL MILLING HEADS
TB-4 TAPER BORING TOOLS



SHAPERS

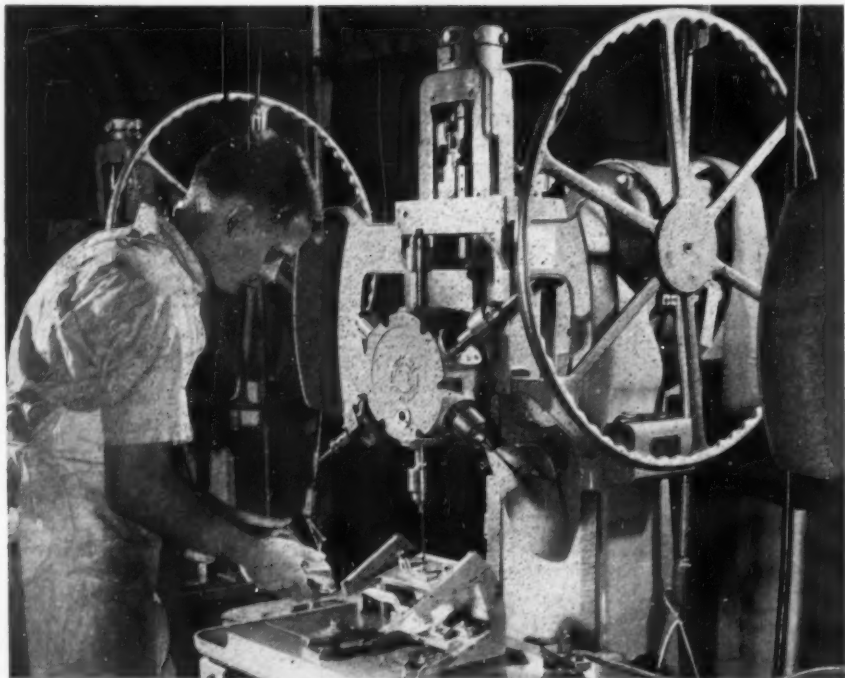
Smith & Mills



Compare Smith & Mills with any other shaper for versatility, speed, cutting power and precision performance. Compare and you'll buy Smith & Mills—famous for high quality shapers since 1888. Write or wire for prices, deliveries, repair parts or field service. Smith & Mills Shaper Division, Nebel Machine Tool Corp., 3491-B Central Parkway, Cincinnati 25, Ohio.

Smith & Mills Shapers now available in Heavy Duty Models in 16", 20", 25", 28", 32" and 36" strokes, and Standard Duty Models in 20" and 24" strokes.





BURGMASTER® turret drills increase servo actuator production **25%**

Here is what they say at Parker Aircraft Company, Los Angeles:

"Our bank of five 6-spindle Burgmaster turret drills have replaced a large number of single spindle machines and on this job performed thirty operations with a production increase of 25%. Drilling, tapping, counterboring and countersinking was accomplished with one set up. Lightweight fixtures could be used and, with fixture clamped in alignment under the

spindle, a higher level of quality was maintained with improved finish. Repair work dropped to a minimum."

Automatic hydraulic Burgmaster (6- and 8-spindle models) feature skip indexing, automatic cycling and infinitely variable pre-selective feeds. All models (including the 6-spindle manuals and radial) provide power indexing, pre-selective spindle speeds and very close pre-selective depth control.

For complete information, write Dept. MT-1



BURG TOOL

Manufacturing Company, Inc.

15001 S. Figueroa St., Gardena, Calif.

Sales Offices:

RIDGEWOOD, N.J.: Burgmaster Eastern Sales Div.
86 N. Maple Ave., Gilbert 4-3002

CHICAGO: Burgmaster Machinery Co.
5329 Lincoln Ave., Uptown 8-7161

SAN FRANCISCO BAY AREA: Paul A. Kulju
857 Estabrook Street, San Leandro, Calif. LOckhaven 9-2244

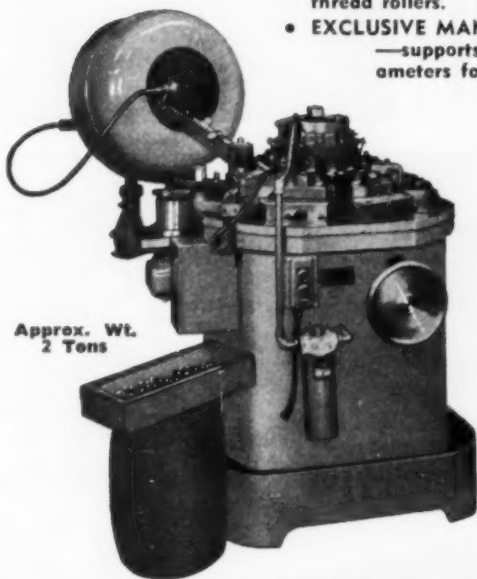
Use postpaid card. Circle No. 209

Prutton

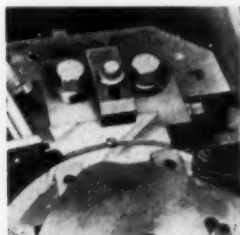
THREAD ROLLING MACHINERY

PRUTTON Exclusive PLANETARY DIE SYSTEM ... Makes The Difference!

- 300% FASTER THREAD ROLLING
- 65% SAVING OF MAN HOURS
- SECTIONAL PLANETARY DIES replaced at a fraction of the cost of complete circular dies.
- 4 to 7 TIMES LONGER DIE LIFE
- PRUTTON DIES FROM STOCK—large selection in standard widths and forms.
- 2/3 LESS FLOOR SPACE—replaces 3 reciprocating thread rollers.
- EXCLUSIVE MANDREL AND STEADY REST SYSTEM—supports inside diameters and outside diameters for concentricity.



Approx. Wt.
2 Tons



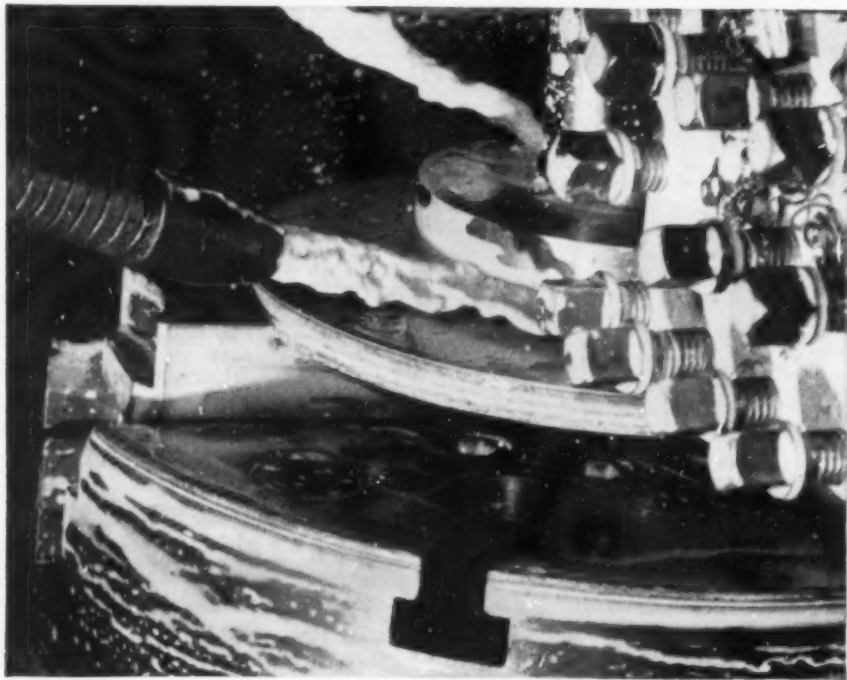
PRUTTON Exclusive PLANETARY DIE SYSTEM with replaceable sectional dies—outperforms other types 3 to 1

Let us demonstrate how Prutton superiority can work for you. Submit your parts for our recommendations. No obligation, whatsoever.

Prutton Corporation

5296 WEST 130th ST.

CLEVELAND 30, OHIO



TURNING AND DRILLING. During the machining of a 9-in. piece using carbide-tipped tools, S.E.C.O. removes heat fast ... assures long runs, top speeds.

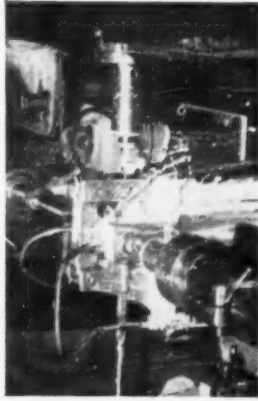


HOBGING. Flooding the cutting edges of a high-speed-steel hob working 1117 steel, S.E.C.O. provides lubricity and cooling power needed for long tool life.



CENTERLESS GRINDING. In grinding 4320 H steel pins, S.E.C.O. keeps wheels clean. Grinding dirt drops out quickly, is not recirculated. Parts are rust-protected.

SUNOCO EMULSIFYING CUTTING OIL HANDLES 4 TOUGH JOBS... EASILY



DRILLING AND REAMING. On steel forgings with a 350/400 Brinell, S.E.C.O. keeps the drills cool...gives clean cutting action.

Whether you are shaping, hobbing, grinding, reaming, boring or milling, it will pay you to look into the advantages of SUNOCO EMULSIFYING CUTTING OIL.

Moderately priced, S.E.C.O. has been industry's most widely used soluble cutting oil for years. Higher-than-ever machining efficiency, increased detergency, easier mixing, and other added advantages are helping keep S.E.C.O. the leading emulsifying cutting oil in the country today.

For complete information about S.E.C.O. see your Sun representative. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MT-1.

Use postpaid card. Circle No. 211

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LIMITED, TORONTO AND MONTREAL



* *Controlled* **Measure**

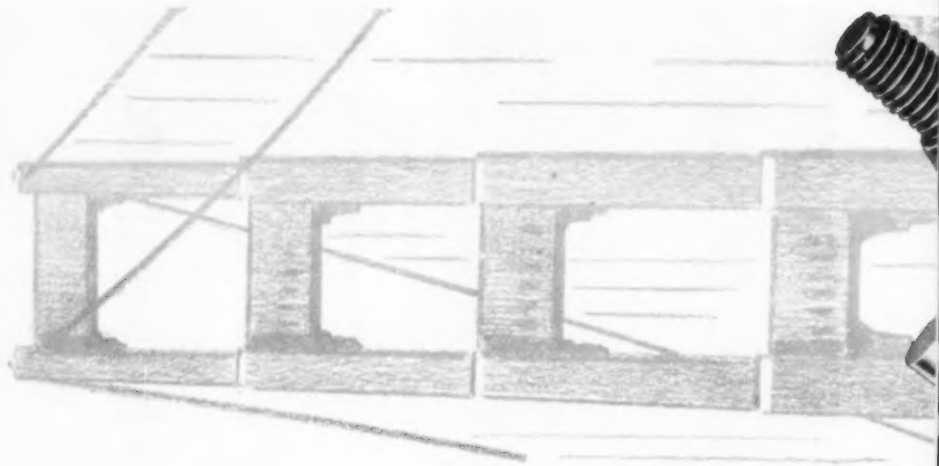
There's something majestic about a bridge. We often view it in its entirety... without appreciating the many components that contribute toward its strength as a unit.

Yet — even in such a huge structure... controlled measure is important.

Precision and balance of parts are carefully engineered for stress and strain. Each part must fit in ratio, as accurately as the intricate pieces of a delicate instrument.

Bath cylindrical plug or thread, ring or reversible type gages, guarantee controlled measure of component parts on the inspection line.

Made for dependable service and long wear-life... Bath gages are your best buy for reliable check of threaded and plain parts.



14 Grafton St., Worcester, Mass.

CYLINDRICAL AND THREAD GAGES • GROUND THREAD TAPS
INTERNAL MICROMETERS

** When you buy Bath Gages . . .
you buy controlled measure!*



*for the best buy
... buy Bath*

No matter how many cutting tools
You can get the "whole package"
MORSE-FRANCHISED



Take a close look at this set-up and you'll see these 7 tools: Center drill, cobalt drill, carbide core drill, facing and turning tool, roughing reamer, finishing reamer, tap.

One man supplied all seven tools. And he, of course, is your Morse-Franchised Distributor . . . your only source for all the varied requirements of a complete tooling job like this. And the job is protected . . . *results insured* . . . by Morse Quality in every single tool. So call in this "I-man team" today . . . he makes Morse Tooling pay *all ways*.

MORSE TWIST DRILL & MACHINE CO., NEW BEDFORD, MASS.

Subsidiary of VAN NORMAN INDUSTRIES, INC.

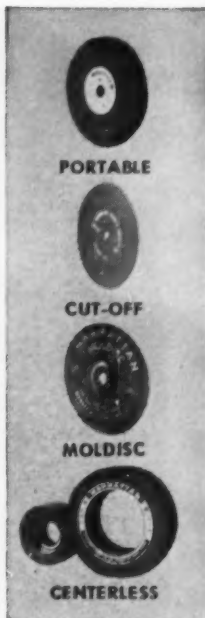
Warehouses in New York, Chicago, Detroit, Dallas, San Francisco



MORSE
means
"THE MOST"
in Cutting Tools

in a set-up...
from your
DISTRIBUTOR





"More Use per Dollar" with MANHATTAN CUT-OFF WHEELS

In factories where records are kept, Manhattan Cut-Off Wheels have proved they do a better, cleaner cutting job . . . and last longer than any other wheels! Exclusive Manhattan developments in both rubber and resinoid bonds account for this greater cutting efficiency and longer service life. Every Manhattan wheel is custom-bonded for your specific cut-off job . . . to give you cleaner, cooler cutting at higher machine speeds whether you work with

hardened or soft steels, light gauge tubing or critical alloys.

Manhattan Cut-Off Wheels are made to your order in the widest range of types and sizes. Manhattan Portable Wheels, Moldiscs, and Centerless Wheels are also custom-made for specific operations at your plant. Let a Manhattan Abrasive Wheel engineer show you how you can save time and money . . . get "More Use per Dollar" . . . with Manhattan Cut-Off Wheels and other types of high speed, heavy duty abrasive wheels.

RM-742-R



WRITE TO THE ABRASIVE WHEEL DEPARTMENT

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

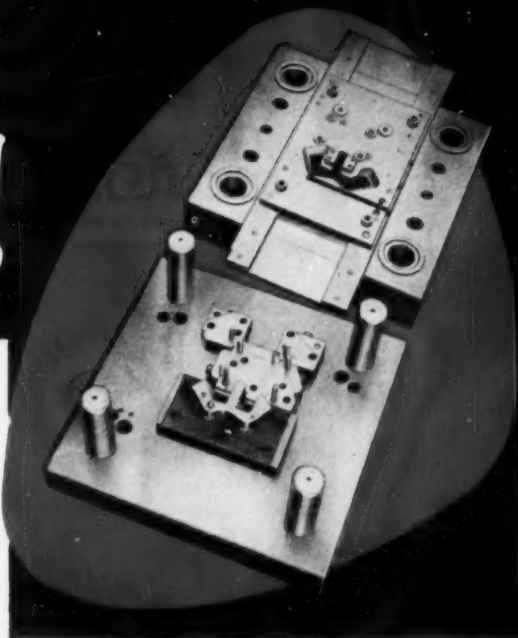
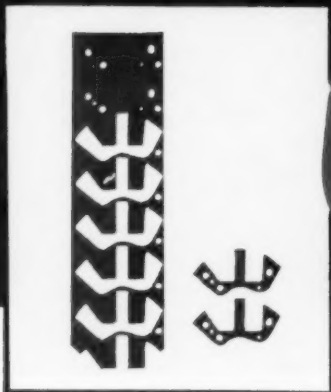


Belts • Hose • Roll Covering • Tank Linings • Industrial Rubber Specialties • Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Use postpaid card. Circle No. 214

MACHINE and TOOL BLUE BOOK

Carbide Economy!



4700 MAGNETO LAMINATIONS PER HOUR!
PRODUCED BY GALE PRODUCTS, DIVISION
OF OUTBOARD, MARINE & MFG. CO., GALES-
BURG, ILL., WITH A HARIG CARBIDE DIE.

Producing laminations for outboard motors and rotary power mowers, this Harig carbide die produces an average of 2½ to 3 million parts before reconditioning is necessary. Parts must be burr free to assure alignment of stack, and tolerances held from .002 to .006 maximum. Stamping material is Silicon core plated c-2 #26 ga. .0200—.0170 steel.

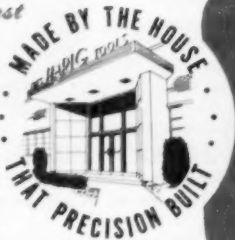
This is a typical example of Harig engineering and manufacturing skill. Pioneers in the use of carbides, Harig sets industry standards for precision and quality.

Let us estimate your next special tool or die job. There is no obligation.

*Headquarters for the Finest
in Precision Tools!*

Harig engineering skill is at your disposal whenever you need special precision tools and dies. We will be

glad to send you this fully illustrated catalog showing our services and facilities.



Harig

Manufacturing Corp

3763 West Howard St.
Chicago, Ill.

Ellstrom CHROMIUM PLATED Standards

"Measuring in Millionths for Three Generations"



Now! Closer gage block tolerances give you up to 75% longer wear life at no increase in price!

Ellstrom Standards are now produced and unconditionally guaranteed to specified millionths well within the following improved gage block tolerances:

"W" Working Accuracy Blocks: $+.000008''$, $-.000002''$ per inch of length, with flatness and parallelism held within $.000006''$.

"I" Inspection Accuracy Blocks: $+.000004''$, $-.000002''$ per inch of length, with flatness and parallelism held within $.000004''$.

In addition to providing finer accuracy at no increase in price, these Ellstrom Standards also give you up to 75% longer wear life. For, by reducing the allowable "minus" deviation, you get an additional guaranteed wear allowance of from 2 to 6 millionths of an inch, as compared to

common industry standards, before the blocks need be considered worn undersize.

Ellstrom Standards are furnished in 28 basic sets of from 8 to 92 blocks in both rectangular and square styles. Individual blocks are also available in sizes ranging from $.010''$ to and including $20.000''$ to meet your particular needs. Send for complete specifications and prices today!

Set No. 35-R: "W"—\$195.80; "I"—\$280.50

Set No. 81-SA:

"W"—\$545.60; "I"—\$764.35



ELLSTROM STANDARDS DIVISION
DEARBORN GAGE COMPANY

"Measuring in Millionths for Three Generations"

22038 Beech Street • Dearborn, Michigan

REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES AND CANADA

DESIGNED FOR THE MACHINIST'S TOOL BOX



Here's a catalog that exactly fits in a machinist's tool box in more ways than one. Not only are the Putnam Catalog physical dimensions exactly proportioned to fit within standard tool boxes so that it will always be handy, but, conveniently listed and illustrated within the Putnam Catalog are over 1400 different types and sizes of standard end mills.

Because at Putnam we specialize in the manufacture of end mills, you will find more standard sizes and types listed in this catalog than can be found in any other. Thus, on nearly every milling job you will find the quick and convenient answer to your end mill requirements right in your own tool box—in the Putnam Catalog.

If you would like a copy of this catalog, see your neighbor, the local Putnam distributor—this catalog is yours for the asking.





Kendex® multiple grooving tool, with 12 Kennametal "turnover" button inserts, and shims of Kennametal for fast groove cutting and rapid, accurate indexing

KENNAMETAL® Tooling for Special Jobs

Kendex principle is adaptable to a wide variety of job requirements

Many machining jobs often can be done better, faster, or at less cost with a new cutting tool . . . or a tool that is adapted to the existing conditions. These photographs show Kendex® Tooling re-designed for specific jobs.

Experienced Kennametal engineers will work with you to find the best approach to your metal-cutting problems. Often a modified standard tool is the answer. Sometimes an entirely new approach with specialized tooling may be the only solution to improve production. In either case, the chances are that Kennametal's experience during the last 18 years has solved a similar problem. Result: Time is saved, development work is reduced to a minimum and basic design has been proven.

If you have a stubborn, high cost production job, perhaps your Kennametal tool engineer can quickly suggest a solution. He devotes his time exclusively to tooling problems with one objective—to get the right tool and right grade of Kennametal on the job. His broad experience in tool design and

Boring bar utilizing Kendex clamped-holder principle and Kennametal triangular inserts of the "turn-over" throw-away type . . . eliminates grinding . . . reduces downtime.

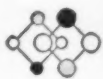
Facing and chamfering completed in one pass with a two-in-one Kendex Tool and Kennametal inserts. Since only the middle of chamfering insert is used, inserts may be interchanged after use, thus doubling the number of cutting edges for both operations.



tool application is supplemented by that of our Research and Engineering staffs. They provide the best tools and most practical techniques for metal-cutting and forming operations. Call your Kennametal Representative or write to KENNAMETAL INC., Latrobe, Pa.

*Trademarks

B-11404A



INDUSTRY AND
KENNAMETAL
...Partners in Progress

Use postpaid card. Circle No. 218

0A

9" column 3'-4' arms

1A

9"-11" column 3'-4'-5' arms

3A

13"-15"-17" column 4'-5'-6'-7' arms

4A

19" column 6'-7'-8' arms

5A

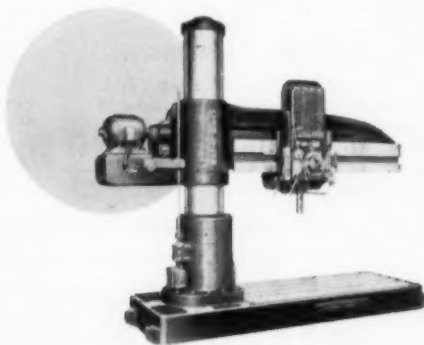
22"-26" column 7' to 12' arms

Carlton

*specialists in
radial drills*

Carlton has specialized in radial drill research, engineering and manufacturing since 1916. Our close contact with—and intimate knowledge of industry's drilling requirements—have produced a wide line of the most modern and up to date radial drills. Made in arm lengths from 3-ft. to 12-ft., column diameters from 9" to 26". Programming, pre-select and manual speed-feed controls, plus special bases, tables, and jigs available for additional productivity. For further information, send today for free descriptive bulletins.

The Carlton Machine Tool Co., Cincinnati 25, Ohio.



SEE FOR YOURSELF

why you can be sure of...

- LOW MICROINCH SURFACE FINISHES
- TOLERANCES DOWN IN THE MILLIONTHS
- INCREASED PRODUCTION
- LOWER COSTS

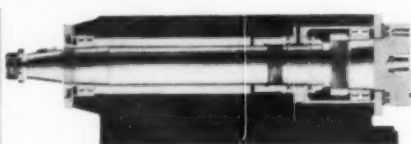
when you specify...

POPE PRECISION SPINDLES



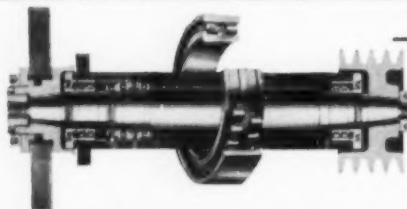
FOR SURFACE GRINDERS —

POPE 1, 2 and 3 HP, Totally Enclosed 1800 and 3600 RPM Motorized, Cartridge Type Spindles with massive shafts and big, double row cylindrical roller bearings having enormous capacity, superior performance and long life.



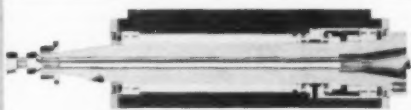
FOR BORING ROUND HOLES WITHIN MILLIONTHS OF AN INCH

POPE Heavy Duty Boring Spindles for smooth, chatter free, continuous high production of accurate parts. Again, look at the big cylindrical roller bearings and thrust bearings.



FOR CYLINDRICAL GRINDING —

POPE Cartridge Type and Wheel Head Belt Driven Spindles with the capacity to produce more work whether you plunge grind with a crush dressed wheel, remove surplus metal, or produce low microinch surface finishes. Note the super-precision radial bearings and ball thrust bearings.



FOR HEAVY DUTY MILLING —

POPE Spindles have the double row cylindrical roller bearings for the extra rigidity to support the cutting tool, and the double direction thrust bearings with the excess capacity to stabilize the shaft against endwise movement in either direction. This adds up to longer cutting tool life, more production, lower cost per piece.

POPE engineers and builds standard and special, precision anti-friction bearing Spindles for every purpose. Send us your specifications for prompt quotations.

No. 115

Specify

POPE
PRECISION SPINDLES

POPE MACHINERY CORPORATION

Established 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS

Use postpaid card. Circle No. 220

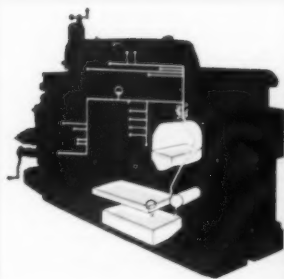
50 lbs. oil pressure

**IS NECESSARY WITH
A CUT LIKE THIS...**

This tremendous cut demonstrates the ability of the 50 p. s. i. lubrication system to develop and maintain oil films under the heaviest loads.

It also demonstrates the strength, rigidity and power which are standard features on all Cincinnati Rigid Shapers.

Demonstration cut on Cincinnati Rigid Shaper. Actual size steel chip, 2" cut, .030" feed.



50 p.s.i. system includes 50 micro filter, settling basin and reservoir. Transmission runs submerged in oil.



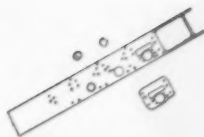
• Write **Department H** for Bulletin
"Cincinnati Rigid Shapers"

☆ The Electro-Magnetic Brake and Clutch with finger tip control are standard features on Cincinnati Shapers for maximum speed and ease of operation.

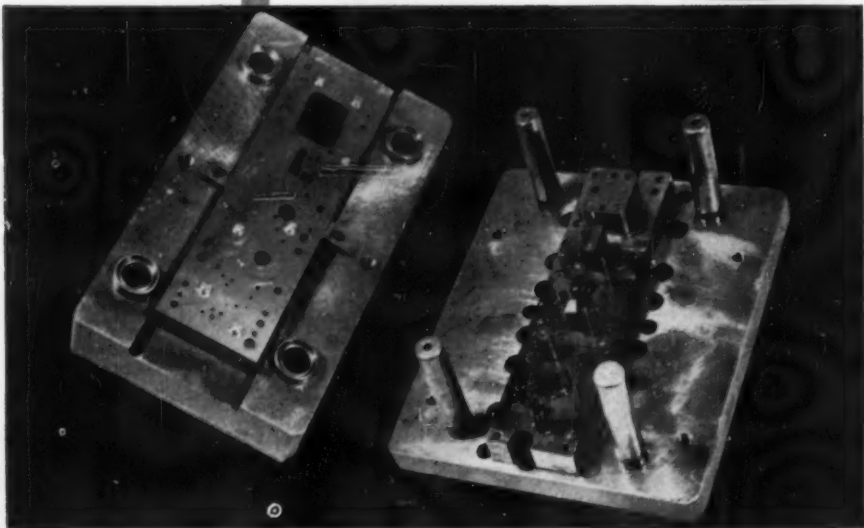


THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES



This **HURON** Lamination Die Gave Initial Run of **426,000!**



Write for **BLUE SHEET**
on **HURON**

This concise four-page folder gives all needed handling and shop treatment details on Huron. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc. Ask for your copy.

ADDRESS DEPT. M12-85

A-L HURON high-carbon, high-chrome die steel was the material used in this motor lamination die. Here was the result when the die was run on a 45-ton Bliss press at 210 strokes a minute:

- 1** Initial run was 426,000 pieces
- 2** Average run since has been 250,000 pieces
- 3** Although burr tolerance is .003", grinding of punch and die between runs has not exceeded .008".

HURON WAS SELECTED because of its known high resistance to wear, especially under heavy pressures, and its excellent non-deforming qualities. Because Huron is an oil-hardening steel and hardens uniformly to a great depth, a consistent production rate after each grind was assured.

There's an A-L Tool Steel that will help solve your cutting, forming or blanking problem. Call our nearest office or distributor, or write **Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.**

For nearest representative, consult Yellow Section of your telephone book.

For complete **MODERN Tooling**, call
Allegheny Ludlum

WOW 8364



Use postpaid card. Circle No. 222

MACHINE and TOOL BLUE BOOK

Only

ADAMAS

DEX-A-TOOL

has **ALL 4**

FEATURES



No other toolholder for "throw-away" inserts gives you as many extras-for-efficiency as DEX-A-TOOL by Adamas!

Talk about *fast* and *easy* to work with—DEX-A-TOOL's got them all beat for quick interchangeability, rapid indexing and fast, accurate chipbreaker location after indexing! And versatile? DEX-A-TOOL accommodates both "thin" (1/8") cutting tips with 1/32" nose radius or "thick" (3/16") carbide inserts with 3/64" nose radius!

DEX-A-TOOL's 7 styles and 56 sizes cover the full range of machining conditions! DEX-A-TOOL's precision engineering and many plus features add up to real trouble-free machining! Plan today to test DEX-A-TOOL on your own machines.

There's so much to tell you about DEX-A-TOOL, we've put all the time and money saving facts in a special brochure. Send for your copy now! Address Dept. 531

<p>1</p>  <p>Adjustable chipbreaker</p> <p>Combination chipbreaker clamp is easily adjustable for lightest to heaviest cuts . . . eliminates the need for a separate chipbreaker for varying feeds.</p>	<p>2</p>  <p>Invertible anvil</p> <p>Invertible feature doubles life over other anvils . . . gives up to 8 times the life over anvils which are not indexable and twice the life over anvils which are not invertible . . . copper plated, hardened tool steel or carbide.</p>
<p>3</p>  <p>Holds both "thick" and "thin" inserts</p> <p>"Thick" and "thin" anvils accommodate 3/16" or 1/8" inserts of either carbide or Cerolox (Adamas ceramic cutting tool material).</p>	<p>4</p>  <p>Chipbreaker setscrew</p> <p>Provides fast, precision relocation of chipbreaker.</p>



ADAMAS

**CARBIDE CORPORATION
KENILWORTH, N. J.**

**PRODUCERS OF TUNGSTEN CARBIDE TOOLS, TOOL
TIPS, DIES, WEAR PARTS, DEX-A-TOOL AND
CERALOX.**

- 9" column; 3' or 4' arm • spindle speed ratio of 40-to-1 • 12 speeds (up to 3200 rpm) through direct-reading dial • automatic tapping reverse
- adjustable spring counterbalance (feel remains the same from lightest to heaviest tools)
- hardened tang slot • safety elevating nut and screw (arm can't drop or overrun)
- hardened arm ways for head
- rigid accurate spindle mounted on 5 precision ball bearings

You can acquire this radial for only \$.28 an hour, if you operate two 40-hour shifts, by using Gilbert's new financing plan: 6% simple interest (3% add on), up to 5 years to pay (subject to change).

those who buy
GILBERT
buy Gilbert again

newest *high-speed* radial

Your many demands for a high-speed light-duty radial are met—completely and economically—by this new Gilbert 3 hp machine. Compare its new features with other radials of equal capacity, and you see why the Gilbert is the best buy in its class. Traditional Gilbert accuracy, fast response,

and wide-angle work visibility make your shop more productive, more versatile. Variety of bases, runway mounting, or tables available. Get all the details in Bulletin 255.

The Cincinnati Gilbert Machine Tool Co.
 3340 Beekman Street, Cincinnati 23, Ohio

40%

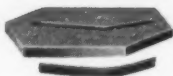
SAVINGS

**in roughing out die
for this blank**

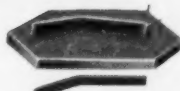
How it was done . . .



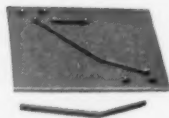
1 First the 7½" slug was removed from the 2¼" cast iron shoe.



2 Then the slug was sawed from the die (1" tool steel).



3 The third operation was the punch holder (1" cold rolled steel.)



4 The slug was removed from the stripper plate (¾" cold rolled steel).

SAW - FILE - LAP with OLIVER of ADRIAN DIE MAKING MACHINES

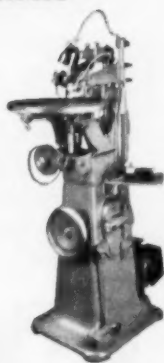


BENCH MODEL

. . . one of the five types in two sizes.

Yes, using the Oliver die making machine saved 40% of the time normally required for roughing out the die for the blank above. The opening has smooth sides, has no rough edges to chip off—and is within .010" of the finished outline. Similar savings can be had on template and cam work.

Oliver die making machines utilize power contour sawing—reduce filing to a minimum. Table tilt produces clearance for die work while filing. Saws, files, lapping sticks and hones can be used interchangeably.



HEAVY DUTY MODEL

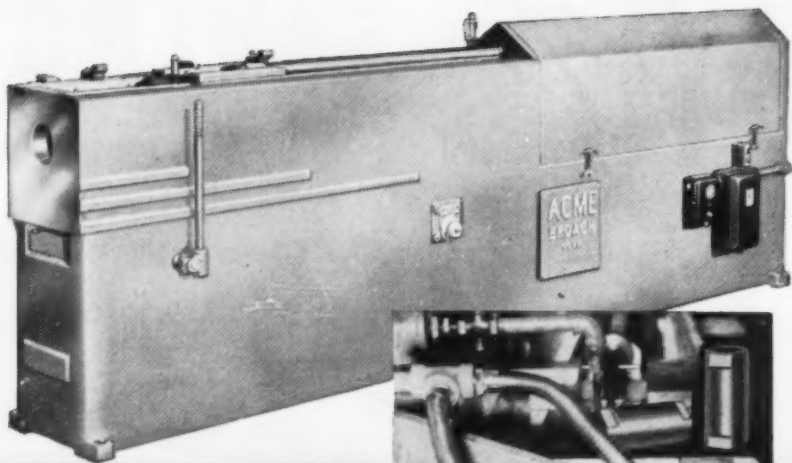
. . . for metals up to 3" thick.

Write today for information

OLIVER of ADRIAN

OLIVER INSTRUMENT COMPANY

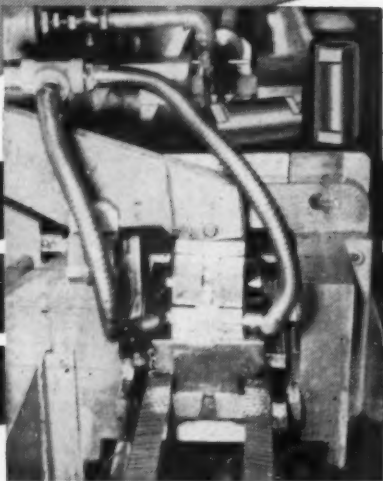
1408 E. Maumee St. • Adrian, Michigan



**Here is the job
that *COULDN'T*
*BE DONE!***

**another outstanding
success by Acme!**

By applying specially designed tooling to a standard Acme horizontal machine, we were able to broach deep flats on one side only of tough steel bushings. . . . Other bushings of various diameters and lengths are broached



with opposed flats on each end . . . Change-over may be made quickly so that broaching of small lots is practical. . . . Large bushings with broached flats on one side may be seen at upper right hand corner of fixture cut.

Let us submit recommendations on your broaching requirements.

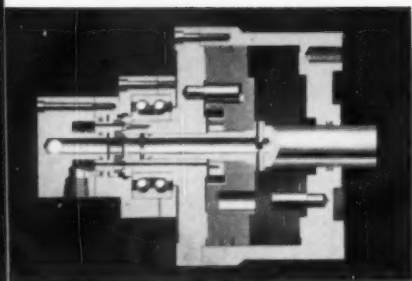
A CME B ROACH C ORP.
MILAN, MICHIGAN

CUSHMAN chucks

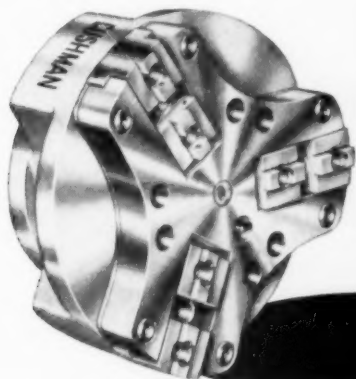
give

Chuck-ability

CHUCK-ABILITY: The ability to SPEED your work
... ELIMINATE fatigue ... IMPROVE your products
... and REDUCE your costs ... through design
and selection of the right work-holding devices.



Typical Cushman Air Operated Chucks and Cylinders for repetitive machining operations permitting increased production at lower costs.



the key to machining efficiency

Today's repetitive manufacturing demands efficient and economical operation of high speed machine tools. Cushman Air Operated Chucks and Cylinders give you **Chuck-ability** with satisfactory performance under the punishment of constant day-in and day-out service ... no loss of chuck or cylinder efficiency over a long service life ... no air leakage problems ... and the feature of quick loading and unloading of work-pieces at the touch of foot or hand.

Chuck-ability is available to you in Cushman's complete line of manually and air operated precision chucks, designed and manufactured to meet today's high metal working quotas at lower production costs.

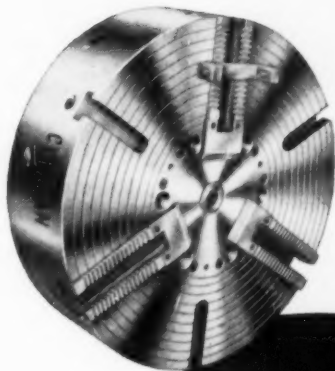
Write today for catalogs fully describing Cushman Chucks. Or, should you have a particular work-holding problem, Cushman can give you **Chuck-ability** in a special chuck, designed and engineered to your requirements.

CUSHMAN CHUCKS ...

a Product of American Quality, Labor and Materials.

THE CUSHMAN CHUCK COMPANY • Hartford 2, Connecticut

a world standard for precision



SEE YOUR INDUSTRIAL DISTRIBUTOR

manufacturers of:

Air Operated Chucks, Cylinders, and Accessory Equipment ... The Cushman Power Wrench ... Cushman Manually Operated Chucks and Face Plate Jaws.



SETS THE STANDARD *for Precision* SURFACE GRINDERS

MODEL 824 Reid-O-Matic with push-button controls for fast selection of all grinding operations and quicker set-up and changes. Outstanding features, for production and toolroom grinding, include: finger-tip level controls, electrical components in single, sealed base housing for easy access, and adjustable gibs on head ways.



Specifications:

Capacity — 8" wide, 24" long, 15" high
Worktable — 66" by 10 $\frac{1}{4}$ " overall
Table speed — infinite variation, 0 to 75 fpm.
Feed range — elevating mechanism, to .0005";
vernier, to .0001"
Spindle — 2 H.P., 1800 rpm. (std. cartridge type)

MODEL 618 — the standard for truly precise toolroom grinding. Features include: rugged construction with one-piece column, cogged timing belt for smooth table operation and sealed cartridge type motorized spindle for smooth chatter-free operation.

Specifications:

Capacity — 6" wide, 18" long, 17 $\frac{1}{4}$ " high
Worktable — 51" by 8" overall
Table speed — infinite variation, 12 to 35 fpm.
Feed range — elevating hand wheel-to .0005";
cross feed — to .001"
Spindle — 1 H.P., 3450 rpm.

*For full details and specifications write for
Bulletin 800-16*

Reid Brothers

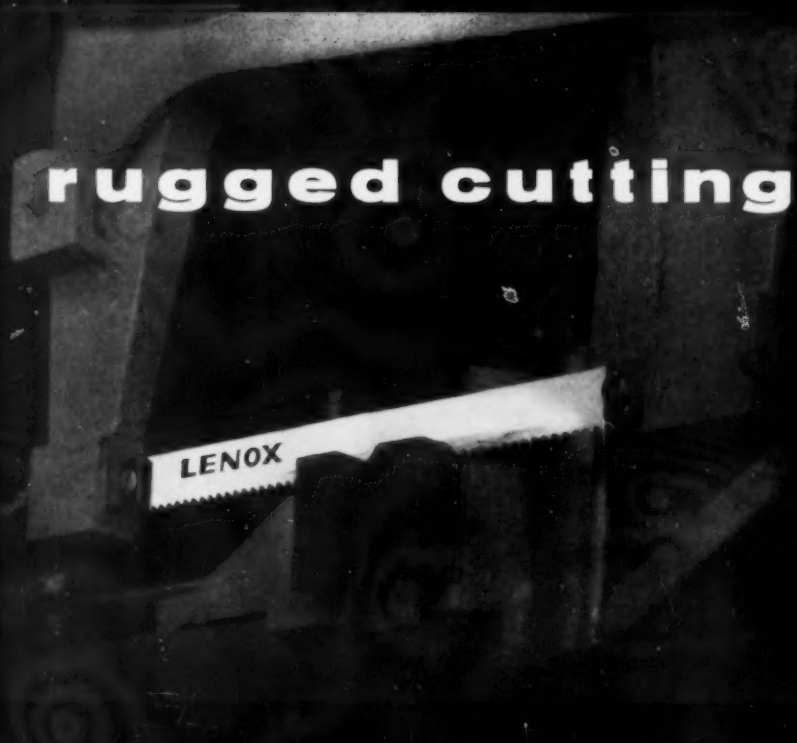


Company, Inc.

BEVERLY

MASSACHUSETTS

rugged cutting..



LENOX

...WITH LENOX MO-SPEED® POWER HACK SAW BLADES

Here is a power hack saw blade that can take it! Power-packed steel, tough-wearing teeth, and straight-cutting performance gives you increased production rates with minute tolerances.

Made of the finest high-speed steel, the LENOX Mo-Speed bites into the toughest materials, takes full-rounded chips, eats through hard spots. You'll spend less time changing blades, get straighter cuts, and boost cutting records when you switch to Mo-Speed.

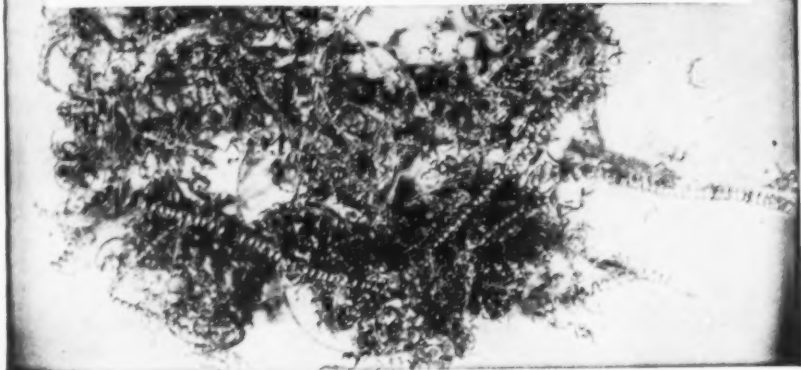
There are three types of LENOX power blades designed to fit your particular cutting needs. Call or write today for full information.



AMERICAN SAW & MFG. COMPANY
SPRINGFIELD, MASSACHUSETTS • U. S. A.

Believe it or not . . .

THESE ARE HONING CHIPS



FULMER

**HONING MACHINES REMOVE
METAL SO RAPIDLY THAT**

**ONLY ROUGH BORING OR DRILLING
IS NEEDED BEFORE HONING**

**FULMER COMPLETE
HONING EQUIPMENT
Has EVERYTHING
YOU NEED IN ONE
"PACKAGE"—**

**Honing Machines—
Tools—Fixtures—
Stones**

Think of the terrific savings in time and labor! In Fulmer Honing Machines the spindle rotating and reciprocating mechanism provide honing of geometrical accuracy and any desired degree of smoothness. The rapid cutting action removes large amounts of material quickly, as shown in the photograph, with chips as long as 6 inches.

Write for Bulletin on Honing to: C. A. Fulmer Co., Dept. B,
105 E. Fourth St., Cincinnati 2, Ohio.



HONING EQUIPMENT

1242 First National Bank Bldg., Cincinnati 2, Ohio

**"ARMED" For MORE
VERSATILE
WORK!**

NEW GREAVES TOOLMAKERS OVERARM

Here's the way to add new "firepower" to toolroom milling operations! Install in your toolroom a GREAVES MILL equipped with this new Toolmakers Overarm.

You'll discover new versatility for milling intricate jig and fixture work, for keywaying, slotting and angular milling. Two graduated swivels permit mounting the spindle head in almost any angle for milling, drilling, spot facing and related operations.

Powered by an independent 2 HP motor, the unit is driven through helical gears. Eight speeds may be selected with convenient controls operating speed change clutches. A hand-fed quill attachment provides 4" tool travel to the spindle. Arbor support fits overarm, permits arbor type milling without changing overarm.

Write for Complete Specifications and Prices

GREAVES MACHINE TOOL DIVISION
J. A. FAY & EGAN COMPANY
2609 Eastern Avenue, Cincinnati 2, Ohio

- Swivels permit any angular setting of spindle head.
- 2 HP independent motor drive.
- 8 speeds from 175 to 1750 RPM.
- Quill has 4" hand feed.
- Spindle equipped with No. 50 N. S. taper; reduced to No. 2 Morse taper when Quill Attachment is used.
- Gears run in oil bath.
- Full vision oil level gauge.

RACK FEED. The overarm is equipped with rack feed for positioning over work.

Manufacturers of
GREAVES MILLS
"the MOST Mill for
the LEAST Money!"

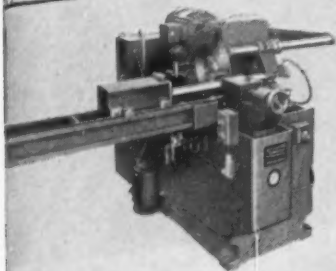


TRY THE MOTCH & MERRYWEATHER

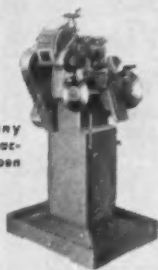
Combination

TO

**HIGHER PRODUCTION,
ACCURACY, PROFITS**



Five sizes of M & M circular sawing machines cut off stock, ferrous or non-ferrous, from 1/4" through 43".



"Own your own". For many reasons — time, production, accuracy, cost—it pays to sharpen your own blades.



Let the Triple-Chip Method make money for you. Segmental type and solid blades 8" through 108" diameter.



Get the most from your cut-off dollars. That means using the Motch & Merryweather circular sawing combination. There's no other way . . . With your own M & M automatic grinder you save days of time, save transportation and other expense, use blades longer, and control work quality . . . Let a Motch & Merryweather specialist demonstrate.

★ ★ ★

Ask for our NEW Circular Sawing Bulletin.

★ ★ ★

**THE
MOTCH & MERRYWEATHER
MACHINERY CO.**

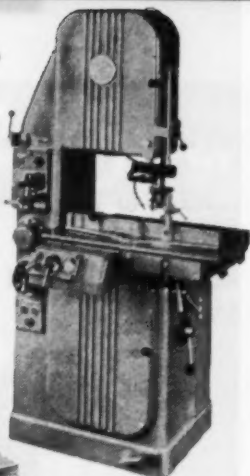
MACHINERY MANUFACTURING DIVISION
CLEVELAND 13, OHIO

Builders of Automatic Precision Cut-Off, Milling and Special Machinery

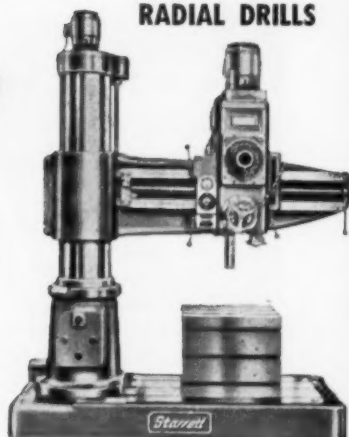
LARSON
PRECISION BORING
MACHINE
\$2495.⁰⁰



KOLLE
model K-16
vertical
contour
metal
cutting
bandsaw
\$1395.⁰⁰



BEST VALUES IN U. S. A.
New Features—High Quality
STARRETT
RADIAL DRILLS



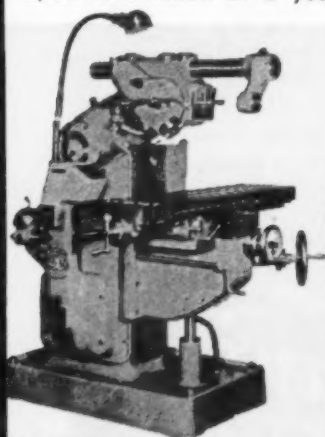
Sizes 2 1/2' to 6'
from **\$1785. to \$6985.**

OUTSTANDING NEW MACHINERY
AT LOWER COST!

\$1.00 BUYS ANY MACHINE

Upon termination of 3 year Rental Plan

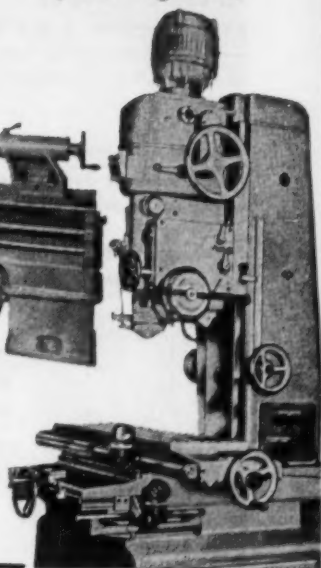
STARRETT
Optical Jig Borer



ABENE vertical-horizontal
milling machine **\$3990.⁰⁰**



BREUER-WERKE
production lathes
speeds to 1,400 rpm



AARON MACHINERY CO., INC.
Dept. B • 45 CROSBY ST., NEW YORK 12 • WA 5-8300

Branches: Buffalo, N. Y.; Mineola, N. Y.; Los Angeles, Calif.

**LIBERAL
TERMS**

NEW *Jarvis* adjustable pitch

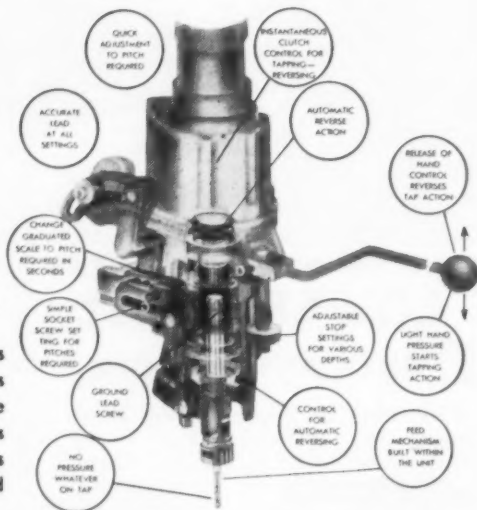
2 models . . . Convertible to 11, 12, 13, 14, 16 18, 20, 24 and 28 pitch . . .

24, 28, 32, 36, 40, 44, 48, 56, 64, 72 and 80 pitch . . . in SECONDS!

**LEAD SCREW
TAPPER!**

Now, one attachment, one lead screw with quick simple adjustment gives convertible tapping in Seconds! Through positive leverage and clutch control, one lead screw running at constant speed, makes these new adjustable pitch lead screw tappers a must in every tapping department.

This is production economy—saves the cost of the individual lead screws for each pitch desired. Saves change over time—converts in a few seconds—by adjustment of four setscrews along a clearly marked graduated scale.



Tap with a feather touch on hand control . . . no pressure on the tap. Stops cut at end of predetermined depth. Automatically reverses upon release of hand control, automatically backs out, leaving clean, accurate threads.

Now, convertible pitch tapping, faster production, new versatility is assured even by unskilled operators—with this single tapping attachment.



WRITE NOW!

Send for bulletin and prices.



Use postpaid card. Circle No. 230

WILLIAMS

TOOLS OF INDUSTRY

FOREMOST! SINCE...

the Construction Industry
adopted the steel skeleton



In the mid 1880's the Tacoma Building of Chicago was the first to acquire an all-metal frame. The skyscraper era and modern construction methods were introduced.



HOIST HOOKS
proof tested from $\frac{1}{2}$ to 50 ton capacity

CARBON WRENCHES

21 patterns, 501 sizes,
openings from $\frac{1}{16}$ " to $7\frac{1}{2}$ "

ALLOY SUPERWRENCHES

20 patterns, 386 sizes,
openings from $\frac{1}{16}$ " to $3\frac{1}{4}$ "

**SUPER SOCKETS and
ACCESSORIES**

in five drive sizes,
openings from $\frac{1}{16}$ " to $3\frac{1}{4}$ "



Since 1882, Williams has anticipated the tool requirements of the construction industry...high capacity hooks to hoist girders and machinery...strong, efficient wrenches to bolt them tight.

Today, Williams makes the Broadest Line of Its Kind.

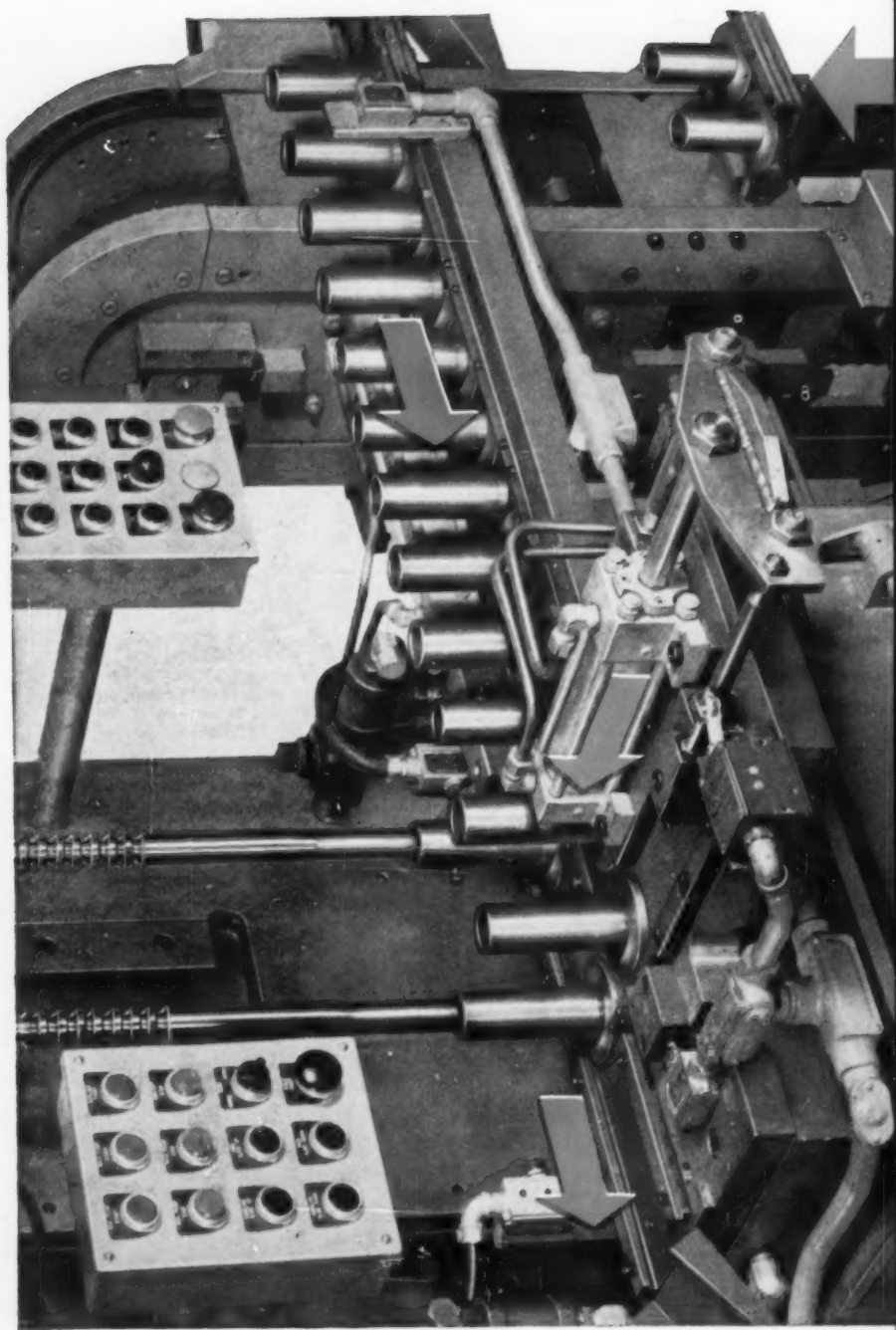
NOTE: You get quickest delivery at lowest cost from your local distributors.

WRITE for Catalog 302 showing the complete Williams line.

J. H. WILLIAMS & CO.
409 VULCAN ST., BUFFALO, N. Y.

• BUFFALO
• NEW YORK
• CHICAGO
• LOS ANGELES

Use postpaid card. Circle No. 231



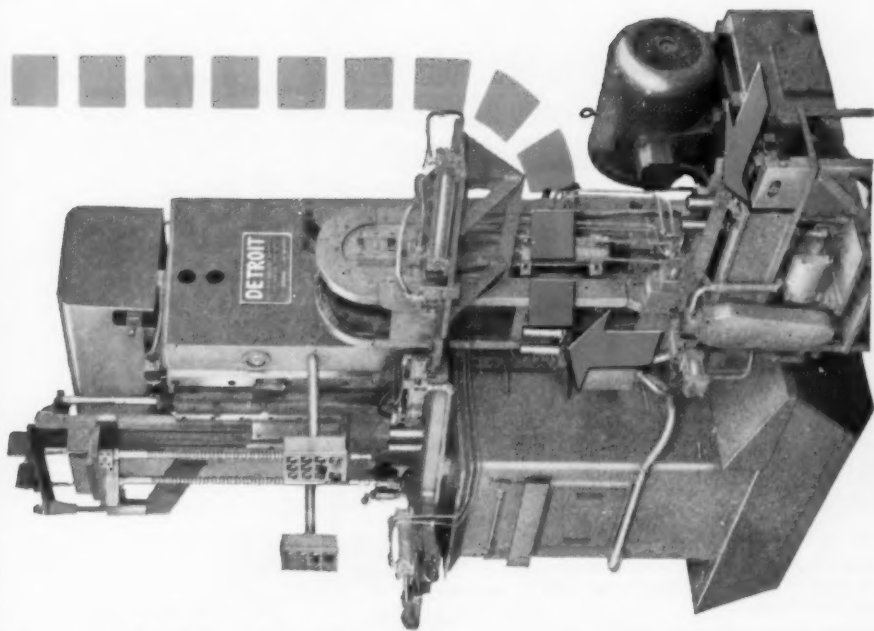
Tooled for AUTOMATION

This broaching setup on a Detroit 15-ton, 42-inch Vertical Pull Down Machine illustrates *practical* automation! It combines the economy of a standard machine, readily retooled for production changes, with a special work handling system that makes floor-to-floor operation fully automatic.

Flanged work pieces are loaded at floor level, conveyed to an elevator, raised, pushed off and shuttled into broaching position, broached and unloaded . . . all without an operator. Each broaching stroke sizes the I.D. and removes excess welding at the flange joint. Parts are handled as fast as they can be supplied by the "automatics" ahead of this operation.

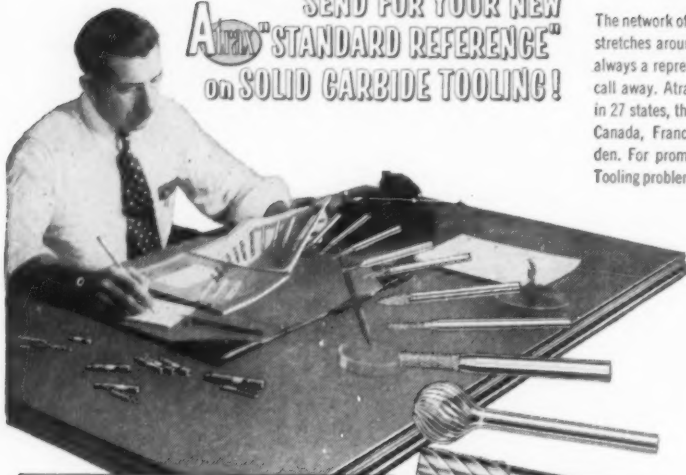
The same broaching specialists who created this productive combination of "standard and special" can help solve *your* production problem. Send parts, prints or details now.

Write for bulletin describing Detroit Vertical Pull Down Machines.



**DETROIT
BROACH
& MACHINE COMPANY**

DEPT. G-1 • ROCHESTER, MICHIGAN



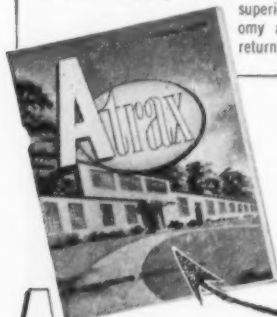
SEND FOR YOUR NEW Atrax® STANDARD REFERENCE™ on SOLID CARBIDE TOOLING!

The network of Atrax Representatives stretches around the world. There is always a representative only a phone call away. Atrax Representatives are in 27 states, the District of Columbia, Canada, France, Portugal and Sweden. For prompt service on Carbide Tooling problems, call your Atrax man.

We're very proud and pleased to announce the latest and largest edition ever of the Atrax Catalog is now ready for distribution.

100 colorful pages, crammed with the most complete line of precision, solid carbide tools available—and with vital, useful information on the use, care and maintenance of Solid Carbide Tools.

See hundreds of standard End Mills, Burs, Reamers, Drills, Routers, Grinding Tools and Special Solid Carbide Tools Engineered to keep your production breaking new records! A 28 page price list will be included. These two necessary references to tooling service, superiority and economy are yours by return mail—FREE!



Send for your
copies . . . NOW



Finish FIRST with Carbide!

THE ATRAX COMPANY

Newington 11, Connecticut

Use postpaid card. Circle No. 233

MACHINE and TOOL BLUE BOOK

12 spindle speeds, instantly selected with direct-reading, color match dial.

All-geared spindle drive transmission.

Totally enclosed quick change gear box. 48 or 54 thread-feed changes.

Ground and flame hardened bedways insure years of accurate service.

Hardened steel gears in all 3 transmissions assure long-life operation.

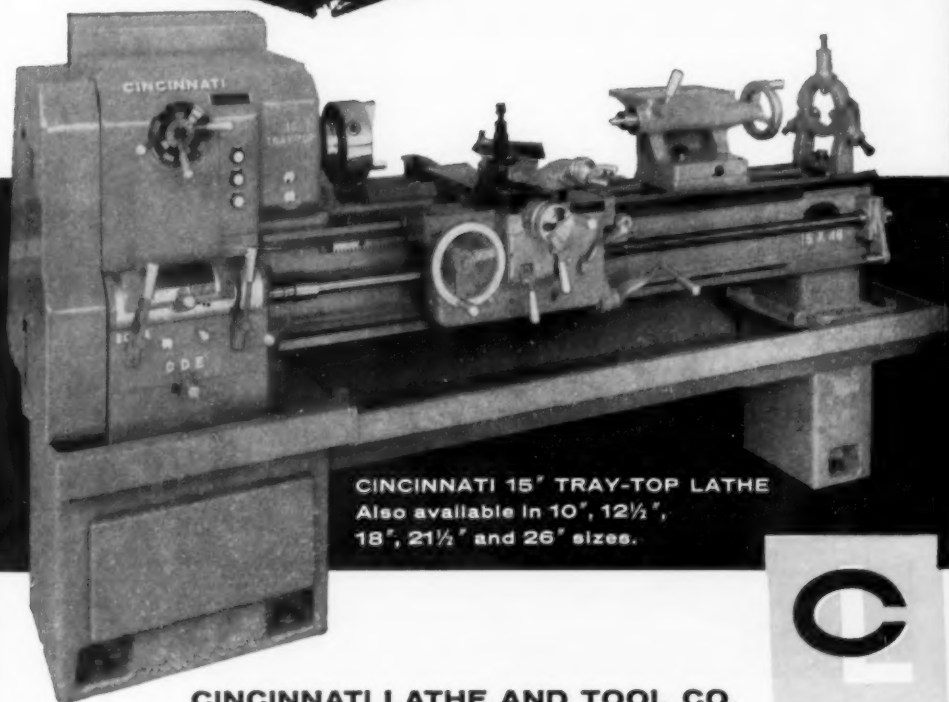
Fully enclosed electrical controls increase operating ease and safety.

Tray-Top Lathes give you many other features normally found only on larger, more expensive lathes. For all the facts and features, see your Cincinnati dealer. Send today for catalog data.

Because it's a

CINCINNATI TRAY-TOP LATHE

more goes into it...
you get more out of it!



CINCINNATI 15' TRAY-TOP LATHE
Also available in 10", 12½",
18", 21½" and 26" sizes.

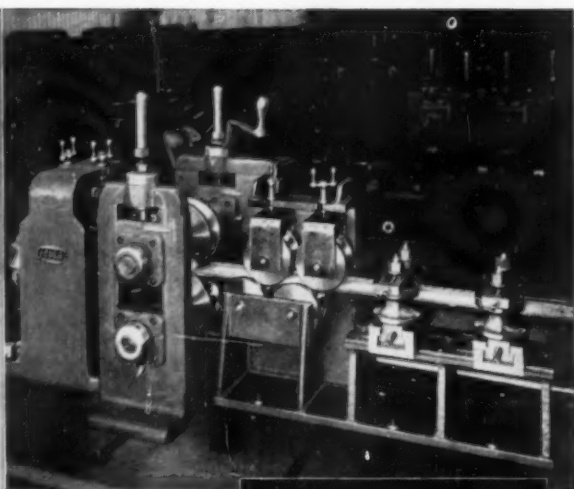
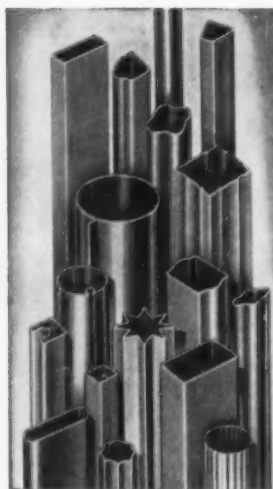


CINCINNATI LATHE AND TOOL CO.

3207 Disney Street, Cincinnati 9, Ohio

Builders of Engine, Toolroom and Fixed Gap Bed Lathes and a Complete Line of Drilling Machines

Use postpaid card. Circle No. 234



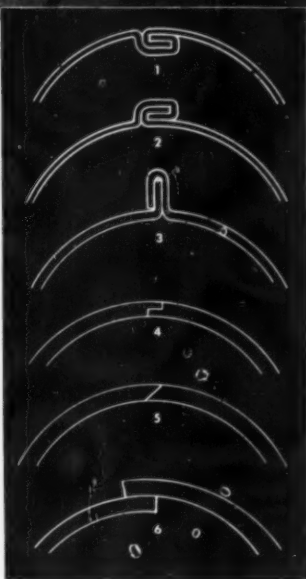
Lock-Seaming attachment at exit end of forming machine.

COLD ROLL FORMING TUBULAR SHAPES

Among the wide variety of things you can make on a Yoder Cold Roll Forming machine are round, square, oval, rectangular and other tubular shapes, such as illustrated at left above. The seams may be open, lapped, butted, dovetailed, interlocking, etc.—as indicated in Figures 1 to 6 at the right.

Millions of feet of such unwelded tubular shapes are made from coiled strip for conductor pipe, bedsteads, lamp stands, window channel, wiring raceways, carrying rods, etc. Production ranges from 20,000 to 50,000 feet per day, with only one operator and a helper.

Yoder offers you the cooperation of their engineering staff for designing and adapting their cold roll forming machines, auxiliaries, and tooling, for the low cost production of structurals, mouldings and trim, panels, tubular and other shapes, to meet individual needs. The Yoder book on Cold Roll Forming is a complete, illustrated text on the art and the equipment needed for performing a variety of operations which can be combined with cold roll forming, at little or no extra labor cost. A copy is yours for the asking.



THE YODER COMPANY • 5509 Walworth Avenue • Cleveland 2, Ohio



**COLD ROLL FORMING MACHINES
ROTARY SLITTING LINES
PIPE AND TUBE MILLS—Electric Weld**



Double Negative Rake

futurmill
model X

"throw-away" blade milling cutters

yield the highest milling performance at the lowest operating cost—

Why?

Double Positive Rake

because—

The bodies of Futurmill cutters are built to hold solid carbide blades with maximum tool rigidity—and these same cutter bodies may be used for many various milling and material applications. They cut tough alloy steels, soft or brittle materials; they perform most accurately at the highest feeds and speeds obtainable; they eject chips properly; they may be used indefinitely.

because—

By employing inexpensive standard solid carbide lathe blanks and "throw-away" blanks as the cutting element (blades) the Futurmill model X reduces the perishable expense (or cost per cubic inch of material removal) to the lowest milling costs known **TODAY!**

because—

Coupled with the Futurmill principles of ease and accuracy of indexability and the elimination of cutter or blade grinding and regrinding, model X presents the metal worker with a tool for modern milling requirements . . . without the burdens of the past.

For further information and literature; write

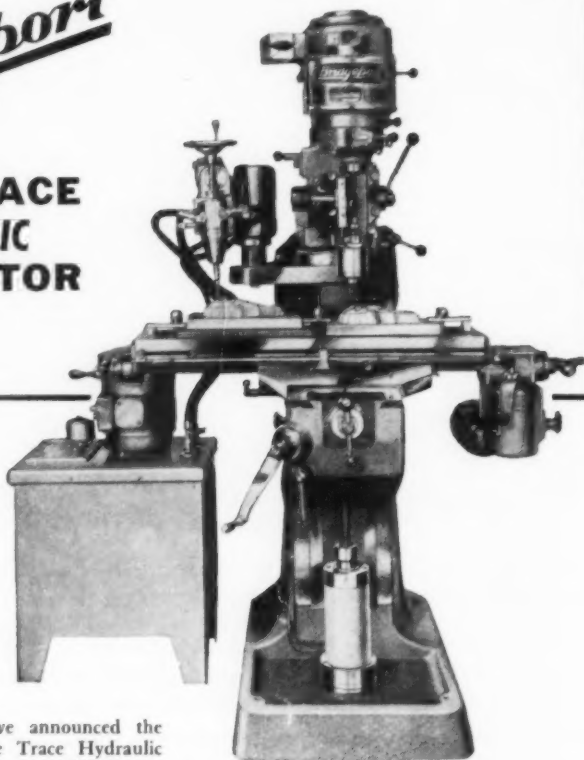
futurmill, inc.

**DETROIT
MILLING
CUTTER
division**

28625 Grand River • Farmington, Michigan • Greenleaf 4-5745-4-8450

The **Bridgeport**

TRUE TRACE HYDRAULIC DUPLICATOR



Twelve months ago we announced the adaptation of the True Trace Hydraulic Duplicator to the Bridgeport Milling Machine. The demand and the favorable comments on the performance of this equipment during the past year have exceeded our most optimistic expectations.

The Bridgeport True Trace combination will give excellent performance and save endless hours when copying irregular dies and moulds.

The stylus mounting fits between the column and the turret and is suitable for either right hand or left hand installation on new or old machines.

The stylus assembly swings out of the way so there is no interference when the machine is used for conventional milling.

Full details on request.

Bridgeport MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

IF YOU HAVEN'T TESTED WHITMAN & BARNES DRILLS



YOU HAVE NOT EXHAUSTED

ALL THE POSSIBILITIES

OF COST SAVING!

Twenty 1½" diameter holes, 4" deep are drilled in oil and gas well casing heads having a Brinell hardness of 185-250. W&B standard high speed taper shank drills are operated at 125 RPM with a feed of .015" per revolution. Drill performance: full 8 hour shifts without a grind!

W & B DRILLS GIVE YOU THREE BIG ADVANTAGES

DESIGN . . . Engineering know-how has created types of drills that perform better and more economically in any specific material—including the newer metals.

QUALITY . . . 109 years of experience have developed rigid steel specifications, step by step inspection and other quality control procedures that insure high uniformity and top performance.

ECONOMY . . . Your W&B distributor can furnish the right drill for practically every job from a wide range of standard sizes and types. Higher cost "speciale" are held to a minimum.

W & B



Here's A Tip From

WHITBY

For the best
in service
—call your
W&B distributor
today!

"Makers of Fine Tools Since 1848"

WHITMAN & BARNES

DRILLS and REAMERS

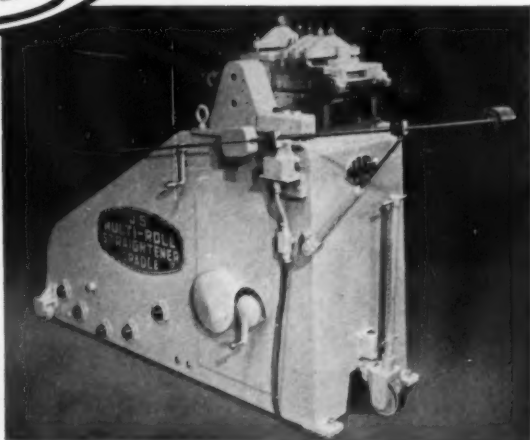
40045 PLYMOUTH ROAD • PLYMOUTH, MICHIGAN
NEW YORK • CHICAGO • LOS ANGELES

USE



Model PDSC-940 (Portable)
Capacity: Material up to 9"
wide x $\frac{1}{8}$ " thick. Coils with
O.D. up to 40". Also made
in other sizes.

REDUCE PRESS- ROOM COSTS



★ U. S. PRODUCTS

Slide Feeds
Roll Feeds
Stock Straighteners
Stock Reels
Stock Oilers
Coil Cradles
Wire Straighteners
Die Sets
Multi-Slides®
Multi-Millers®

Don't allow inefficient operations to devour your profit margin. U. S. Automatic Pressroom Equipment is designed and built to *help you effect savings* in the production of stampings.

The use of coil stock in press operations generally results in the need for a Straightener and a Coil Holder. On operations of this type you can improve efficiency, and at the same time conserve valuable floor space by using a U. S. Combination Coil Cradle and Power-Driven Straightener of the type illustrated above.

Your inquiries are invited.

Ask for Bulletin 100-B.

U.S. TOOL COMPANY, INC.

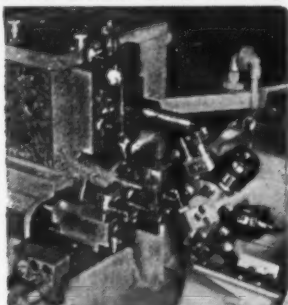
AMPERE (East Orange) NEW JERSEY



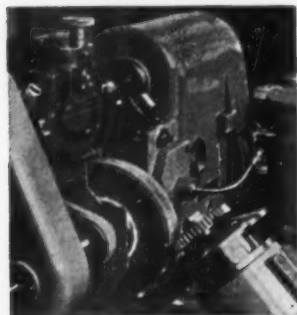
IMPERIAL LATHES

MODEL PS 34/61 \$12,990.

Sliding Bed Gap Lathe
All Sizes Available 12" to 67" Swing



BMW Single Spindle Automatic
Screw Machine

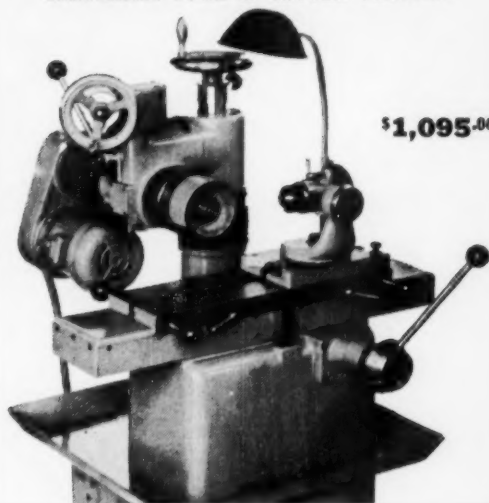


BMW Gear Deburring Machine

Outstanding... New... Machinery at Low Cost

\$1.00 BUYS ANY MACHINE
upon termination of 3 year Rental Plan

H A A S UNIVERSAL TOOL & CUTTER GRINDER

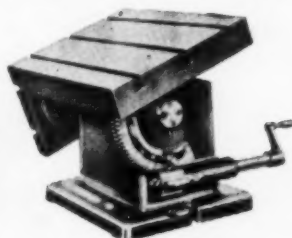


\$1,095.00

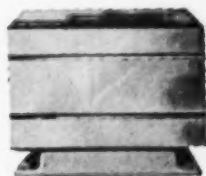
STARRETT—Dividing Heads, Tilting Tables, Box Tables



3 sizes available
from **\$349.00**



3 sizes available
from **\$468.00**



3 sizes available
from **\$179.00**

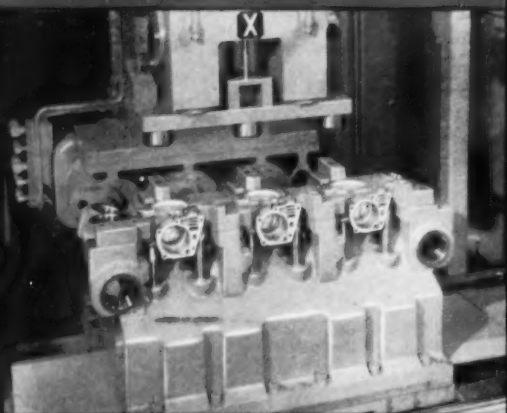
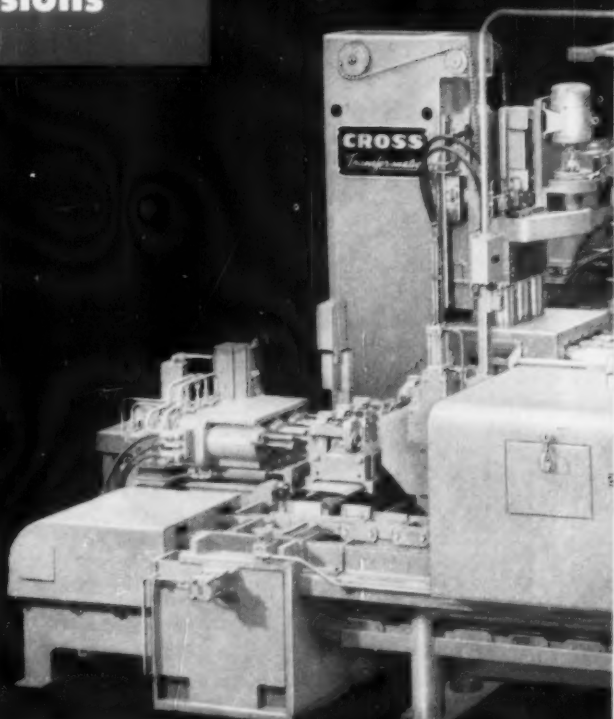
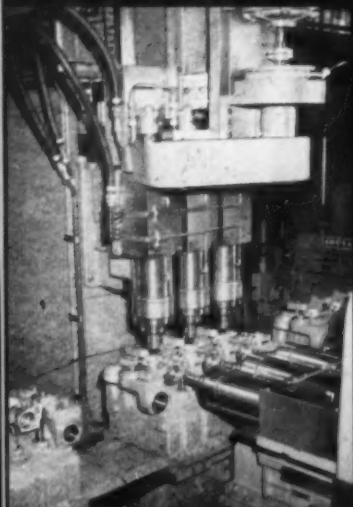
AARON MACHINERY CO., INC.
Dept. B • 45 CROSBY ST., NEW YORK 12 • WA 5-8300

Branches: Buffalo, N. Y.; Mineola, N. Y.; Los Angeles, Calif.

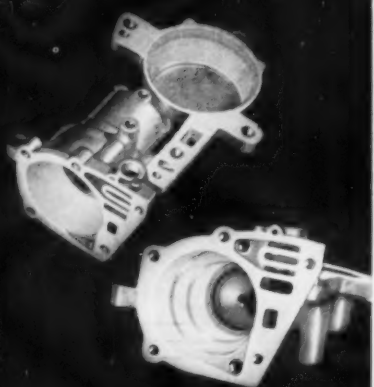
**LIBERAL
TERMS**

Completely Machines Servo Valve Bodies for Automatic Transmissions

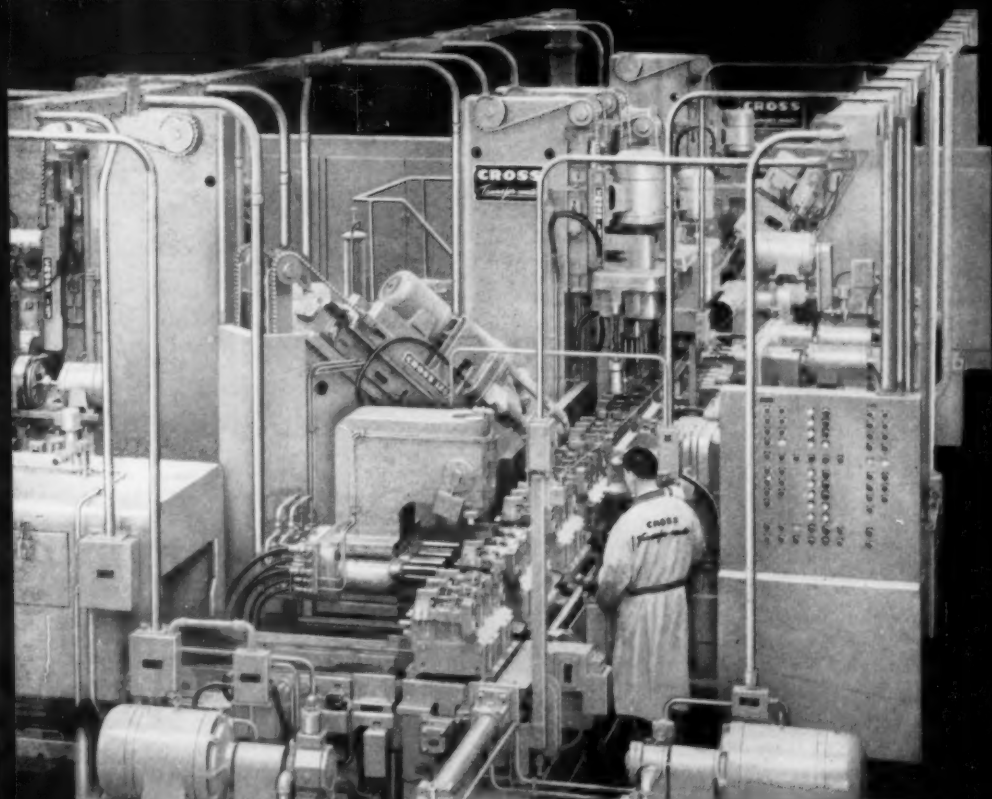
The final precision boring station.



The loading station. Part locations are checked automatically by Unit X to assure proper clamping.



Another Transfer-matic by Cross



Established 1898

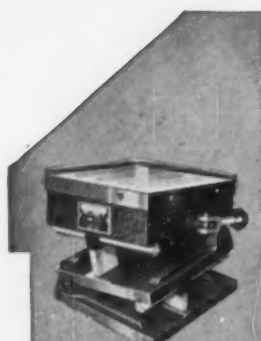
CROSS

CO.

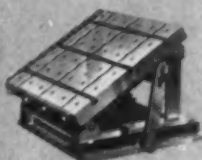
First in Automation

DETROIT 7, MICHIGAN

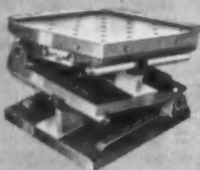
- ★ 21 drilling, 6 reaming, 5 tapping, 6 boring and 2 precision facing operations.
- ★ 490 pieces per hour at 100% efficiency.
- ★ 25 stations—1 loading, 1 unloading, 9 drilling, 1 tapping, 2 rough boring, 2 precision boring, 2 precision facing, 1 washing and 6 visual inspection.
- ★ Palletized work holding fixtures (each fixture carries three parts).
- ★ Unloading unit for removing parts from fixtures and placing them on conveyor.
- ★ Complete interchangeability of all standard and special parts for easy maintenance.
- ★ "Building Block" construction to provide flexibility for design changes.
- ★ Other features: automatic washing unit for fixtures; construction to JIC standards; hardened and ground ways; hydraulic feed and rapid traverse for milling, drilling and boring; individual lead screw feed for tapping.



"Magna-Sine"
Magnetic Sine
Plates for precision
set-ups grinding
single or com-
pound angles.



Heavy Duty Sine
Plates for angular
machining. Wide
variety of sizes.
12" square model
shown.



Inspection Sine
Plates for precision
inspection and
light machining on
single or com-
pound angles.

1ST

Your First Choice
FOR ANGULAR TOOLING....ROBBINS!

A look at the record shows exactly why Robbins equipment for angular tooling should be your first choice! Here's the record:

1ST to originate the idea of a simple sine plate for faster angular toolroom set-ups—1936

1ST to build these as a standard product for general distribution—1936

1ST to build a non-magnetic sine plate designed specifically for precision inspection—1946*

1ST with a permanent magnet chuck—1948

1ST heavy duty sine plate for angular machining—1954

1ST and the only one with the exclusive "PERMA-FLAT" SWIVEL BLOCK—1956

Robbins is the only sine plate manufacturer with a complete line of sine plates for every angular set-up problem in precision machining, grinding and inspection. We also offer complete engineering and manufacturing facilities for the solution of special problems, and are now building high-production automatic assembly and other special machines. Send for sine plate literature, or send us details of your requirements in special machinery.

OMER E.

24800 PLYMOUTH ROAD

DEPT. A

COMPANY

DETROIT 39, MICH.

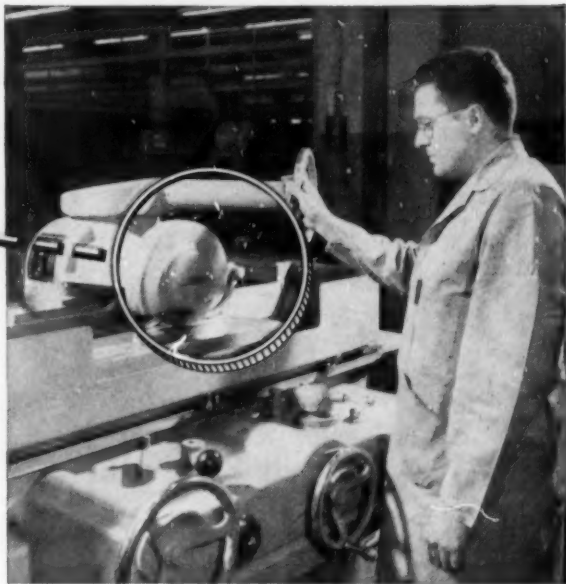
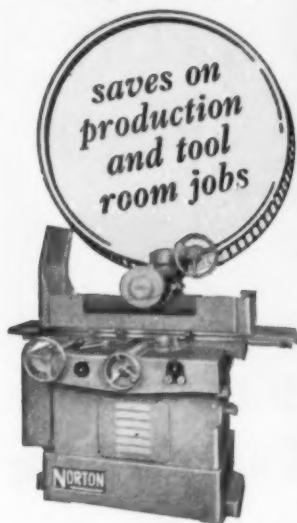
Also manufacturers of special machinery, automatic assembly machinery.

Use postpaid card. Circle No. 242

MACHINE and TOOL BLUE BOOK

Easy to set up... Easy to operate...

*This Norton 8"
Surface Grinder*



Here's a rugged machine that sets up quickly for production runs and maintains steady accuracy on small parts. And it's just as efficient for grinding a variety of small units in tool room work.

Designed with both hand and hydraulic table traverse and cross feed, the Norton 8" x 24" hydraulic surface grinder produces plane surfaces smoothly and speedily. Convenient controls and easy accessibility keep operating and maintenance time low — while the quick, easy set-ups cut your unit costs on job after job.

Write for Catalog 190 on this popular, money-saving Norton surface grinder, or for literature on its 6" and 10" companion

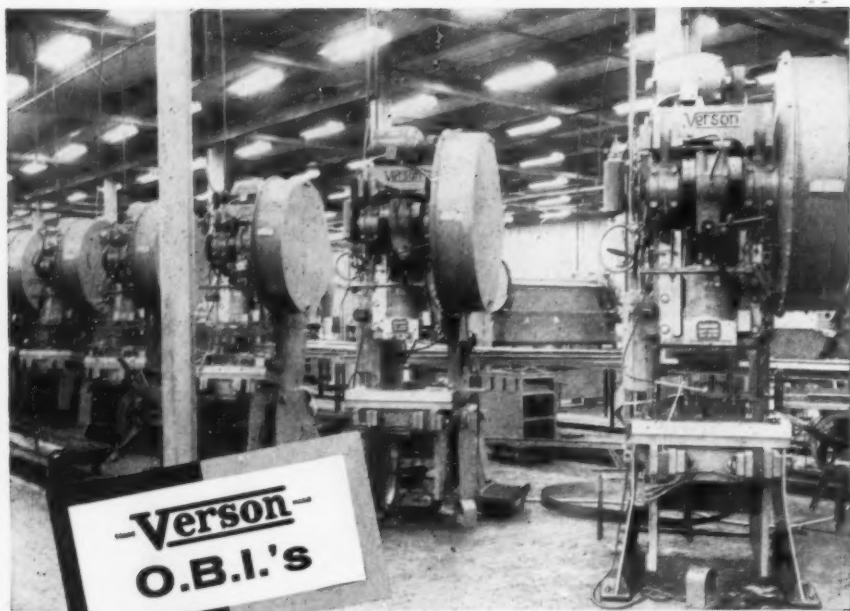
models. And remember — only Norton offers you such long experience in both grinding wheels and machines to help you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.

To Economize, Modernize With NEW

NORTON
GRINDERS and LAPPERS

Making better products... to make other products better

District Sales Offices: Worcester • Hartford
New York • Cleveland • Chicago • Detroit



engineered for quality performance

In O.B.I.'s, only Verson gives you all these big press design and construction features—

- Verson Allsteel Frame
- Mechanically interlocked pneumatic clutch and brake unit
- Steel gear and pinion operating in oil
- Split cap design main and crankpin bearings with renewable bronze bushings

Verson O.B.I. Presses are available in capacities from 90 to 250 tons in standard and special types. A Verson engineer will be pleased to help you select the O.B.I.'s best suited to your requirements. Call or write, today.

A Verson Press for every job from 60 tons up.



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9303 S. Kenwood Avenue, Chicago 19, Illinois
8300 S. Central Expressway, Dallas, Texas

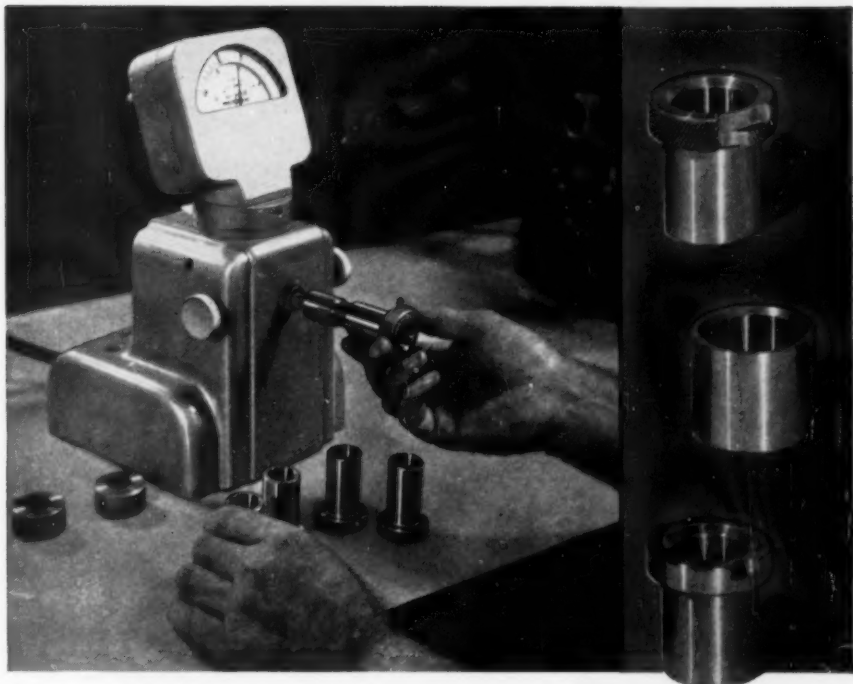
MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES
TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

Use postpaid card. Circle No. 244

MACHINE and TOOL BLUE BOOK



Write for Catalog
OB-54 giving speci-
fications and design
details of Verson
O.B.I. Presses.



EX-CELL-O BUSHINGS LAST TWICE AS LONG

Customer's test proves there is a difference in bushings

New tests by major equipment manufacturer proved beyond doubt Ex-Cell-O Bushings last twice as long as other bushings! After drilling 16,300 holes, wear on other bushing brands averaged .0039"—ready for scrap! Wear on Ex-Cell-O Bushings averaged only .0017".

Here's why: (1) Ex-Cell-O Bushings are made of high chrome and high

carbon oil-hardening bearing steel, (2) automatic atmosphere-controlled heat treating for uniform hardness, (3) precision grinding inside and out, (4) head type bushings and liners are ground under the head for perfect seating.

Call your Ex-Cell-O Representative or write Ex-Cell-O, Detroit. You'll get same day shipment.

EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN

EX-CELL-O
FOR
PRECISION

XLO

MANUFACTURERS OF PRECISION MACHINE
TOOLS • GRINDING SPINDLES • CUTTING TOOLS
• RAILROAD PINS AND BUSHINGS • DRILL JIG
BUSHINGS • AIRCRAFT AND MISCELLANEOUS
PRODUCTION PARTS • DAIRY EQUIPMENT

56-58

Use postpaid card. Circle No. 245

NEW CLAUSING 12" LATHE with Hydraulic Tracer

Flame Hardened Ways • Variable Speed Drive



No. 6390
CLAUSING 12"
lathe with hy-
draulic tracer,
complete as
shown — ONLY
\$2325 F.O.B.
Factory



Contours and O.D. turning, as well as blended radii, steps, and tapers can now be precision duplicated automatically and rapidly, using inexpensive and easily made templates.



Precision duplicating of multiple diameters, tapers, bevels, shoulders, radii, grooves, chamfers

With this new CLAUSING you can . . . do automatic between-center reproduction of intricate patterns in a fraction of the time formerly required • eliminate repetitive measurements, multiple tool set-ups, expensive forming tools • impart a smooth, stepless finish • provide automatic sizing • reduce chance for human error • practically eliminate scrap.

FOR SHORT RUN AS WELL AS VOLUME PRODUCTION — short runs can be done economically because set-up and tool changes can be made in minutes. Savings on long runs are phenomenal.

HANDLES WORK up to 12" diameter, 2½" diameter differential, 18" length. Hydraulic cylinder housed in Servo motor provides power to firmly drive and hold cutting tool. Slide feed, in and out, infinitely variable from 0 to 15" per minute. All critical parts of tracer unit hardened, ground and machine lapped. Bed ways of lathe are flame hardened, ground. Variable speed drive from 43 to 222 and 250 to 1300 RPM, adjustable while running. Completely enclosed head stock, quick-change box, apron . . . oil bath lubrication. Spindle turns on big Timken "Zero Precision" tapered roller bearings.



WRITE FOR ILLUSTRATED LITERATURE

CLAUSING

DIVISION
ATLAS PRESS COMPANY
1-107 N. PITCHER ST., KALAMAZOO, MICH.

Use postpaid card. Circle No. 246

MACHINE and TOOL BLUE BOOK

a complete set
in this **NEW**
compact
carrying case

HELLER

American-Swiss

ROUND HANDLE

NEEDLE FILES

HELLER TOOL CO.



For die makers and other fine toolmakers. Twelve different shapes, each with long knurled handle for firm grip. All are double cut.

SIZE	CUT	WT.
4"	0, 2, 4, 6	0-2
5 1/2"	0, 2, 4, 6	0-5
6 1/4"	0, 2, 4, 6	0-8

Square Handle Needle Files (Escapement) 5 1/2" size—cuts 0-2-4-6—also furnished in this handy plastic kit

NUCUT®
AMERICAN PATTERN

VIXEN®
Milled Curved Tooth

HELLER TOOL CO.

A subsidiary of Simonds Saw and Steel Company

NEWCOMERTOWN OHIO

Branches: New York, Detroit, Chicago, Los Angeles



YOUR HELLER DISTRIBUTOR CAN SUPPLY ALL YOUR FILE NEEDS

Use postpaid card. Circle No. 247

WALKER

and a great industry



For more than fifty years automotive production has relied on Walker holding devices. One of the most popular chucks in the Detroit area is Walker 617 CG. (concentric gap) type, a rectangular chuck that combines longitudinal and transverse gaps. Produced in sizes to meet all holding requirements.

Walker engineers can solve any holding problem.

What is yours?

O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

Profit Maker

Delpark

Filter-Matic TUBULAR SCREEN FILTER

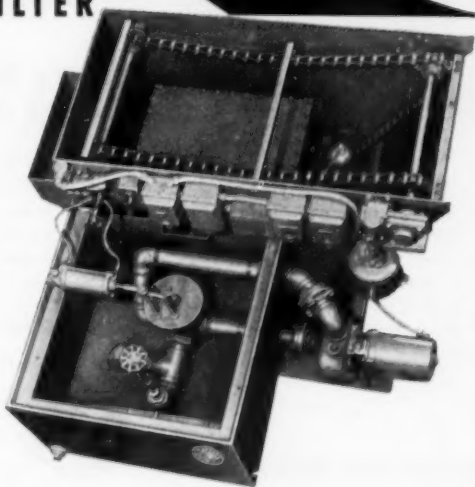
- AUTOMATIC, SELF CLEANING
- HIGH CAPACITY
- SAVES FLOOR SPACE
- OPTIONAL PRE-COAT FEATURE
- PERMITS LOW MICRO-INCH FINISH

**5-1000 G.P.M.
FLOW**

The Delpark Filter-Matic will reduce your operating costs. Here are a few of the ways in which savings can be made.

1. Increased machine efficiency in accuracy and productive time.
2. Reduced maintenance cost in eliminating unnecessary machine wear and reservoir cleaning.
3. Extended grinding wheel and coolant life.
4. Lower coolant operating temperature reduces rejections.
5. Permanent filter media . . . adequate in most cases.

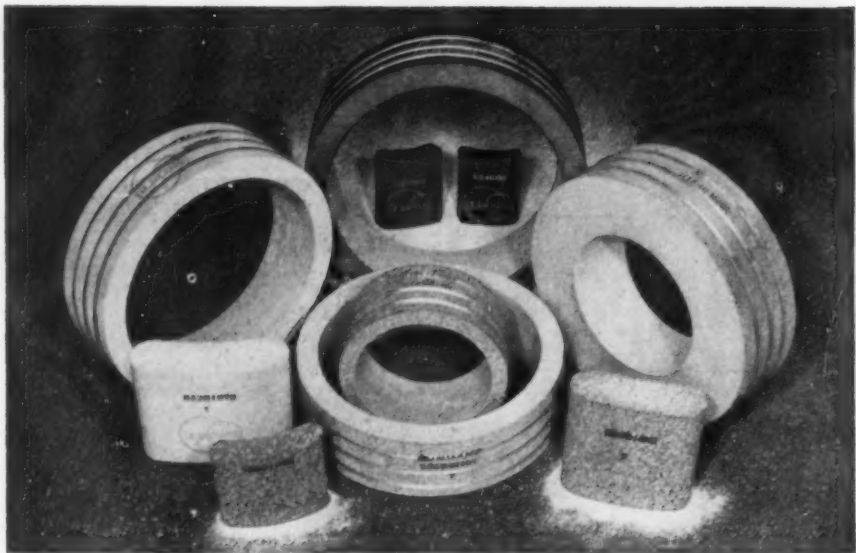
The Delpark Filter-Matic can perform these savings and many others for you. Let a Delpark Field Engineer give you the complete story.



Delpark

. . . FIRST in Filtration Advancements

INDUSTRIAL FILTRATION COMPANY
22 INDUSTRIAL AVENUE
LEBANON, INDIANA



Here's why Blanchard Wheels are best for Blanchard grinding

Almost thirty years ago, Blanchard began developing and manufacturing better grinding wheels for Blanchard Surface Grinders. Our research first produced silicate bonded wheels, and then resinoid bonded wheels.

Today, Blanchard offers silicate, resinoid and vitrified bonded wheels . . . scientifically manufactured and accurately graded in our modern wheel plant.

Use Blanchard Wheels on your Blanchard Grinders. The correct wheel gives you peak production and economy on each job . . . whether the work is tough as copper or fragile as glass, whether it requires heavy roughing cuts or precision grinding within .000010" of absolute flatness and surface finish of 1 micro-inch.

PUT IT ON THE



THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

THE BLANCHARD MACHINE COMPANY 64 State St., Cambridge 39, Mass.

MTB

Please send "The Art of Blanchard Surface Grinding" (3rd Ed.)

NAME _____

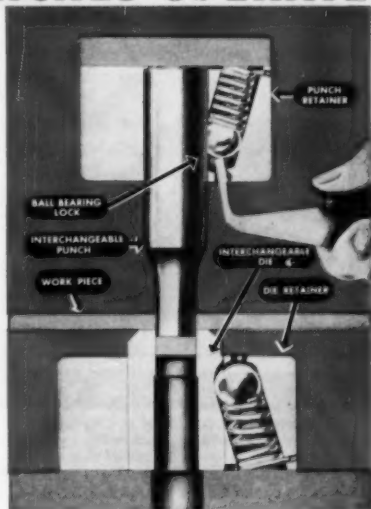
STREET _____

FIRM _____

CITY _____ ZONE _____ STATE _____

Use postpaid card. Circle No. 250

HOW R-B PUNCHES OPERATE



All R-B retainers are equipped with spring-loaded locking balls which engage the recessed portion of R-B punches and die buttons. With a simple push and a twist, R-B standardized punches and die buttons are locked in their retainers . . . they are also instantly removed. R-B punches and die buttons are always accurately aligned—no additional keying is required.

No other manufacturer of punches and die buttons can offer you the amount of successful application experience and the scope of knowledge that is available from the R-B engineering staff for:

- ★ Cutting Your Production Costs
- ★ Reducing Die Designing Time
- ★ Increasing Productivity of Presses
- ★ Supplying Answers to Piercing Problems
- ★ Saving Die Construction Time
- ★ Complete Standardization of Press Tooling



For Additional Information or Engineering Service, Write to:

RICHARD BROTHERS PUNCH DIVISION

ALLIED PRODUCTS CORPORATION

DEPT. 84

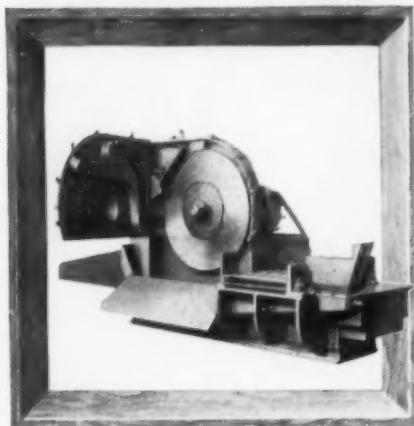
3684 CAPITOL AVENUE

DETROIT 39, MICHIGAN

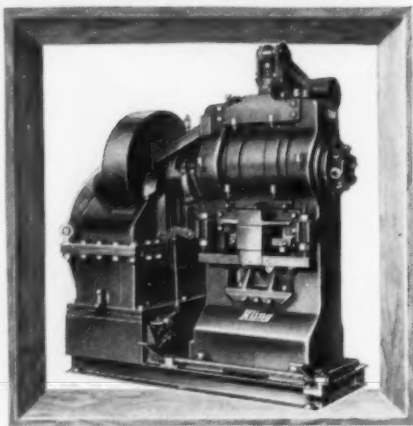
Use postpaid card. Circle No. 251

Friction Sawing

Guillotine Shearing



KLING FRICTION SAWS . . . 10 Sizes
Size 4200 Illustrated



KLING GUILLOTINE SHEARS . . . 5 Sizes
No. 4 Illustrated

*Both Attain New Popularity
Due to Recent **Kling** Improvements!*

KLING FRICTION SAWS make possible faster cutting of steel shapes (structurals and solids) without changing set-up. Also, new KLING developments provide semi-automatic controls for regulating the speed of the carriage and introduce other valuable advancements. Ask for list of users in your industry and send for Bulletins 4200 and 9200 giving you full technical data.



Both are winning more and more "Production Oscars"

KLING GUILLOTINE SHEARS have been completely redesigned to assure users an even wider range of capacities and still sturdier construction. Some of the latest features include fully enclosed power drive and speed reduction unit . . . high tensile strength ductile frame on shear unit . . . shock-resistant alloy tool steel blades . . . new type guarding . . . and welded steel construction base.

*Ask for Bulletin 100 illustrating and describing
Complete Kling Line of Metal Working Machines.*

Exclusive Canadian Distributor: Brown-Boggs Foundry & Machine Co., Ltd., Hamilton, Ont.

1083 MMR

Since 1892

Kling

KLING BROS. ENGINEERING WORKS
1320 N. KOSTNER AVE., CHICAGO 51, ILL.

Export Distributor: Simmons Machine Tool Corp., 50 E. 42nd St., New York 17, N. Y.



Rotary Shear



Double Angle Shear



Punches



Combination Shear, Punch & Copier



Angle Bending Rolls



Plate Bending Rolls

Use postpaid card. Circle No. 252

MACHINE and TOOL BLUE BOOK

Here's the
NEW
SIMONDS
"Easy Access"
(100' COIL)
**METAL
CUTTING
BAND
SAW
PACKAGE**

Makes it easy to remove or retract any length of blade . . . Saves your fingers . . . Protects the teeth . . . Holds 100 lineal feet.

There's no "fighting the box" or tearing your fingers with this new, easy dispensing Simonds Band Saw Package. Its special design makes it easy to pull out any desired length of blade *and retract any excess* without straining or nicking your fingers on the sharp points of the teeth.

Look for . . . ask for . . . this handy new 100' coil package now!

Specify SIMONDS for all your Metal Band Saw needs . . .

- * Standard Tooth (Regular or Wavy Set),
- * Sabre Tooth (with a hook), Skip Tooth,
- * Spring Temper, High Speed Steel

. . . for longest life and lowest cost on contour, cut-off or general purpose work.



For Fast Service
from
Complete Stocks



Call your
SIMONDS
Industrial Supply
DISTRIBUTOR



Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill,
Lackport, N. Y., Haller Tool Co., Newmarstown, Ohio
Simonds Abrasive Co., Philadelphia, Pa., and Arvida, Que., Canada

Use postpaid card. Circle No. 253

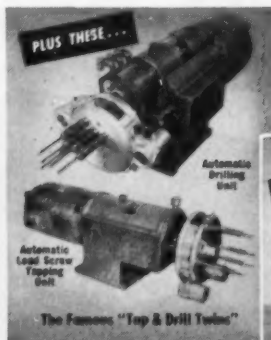
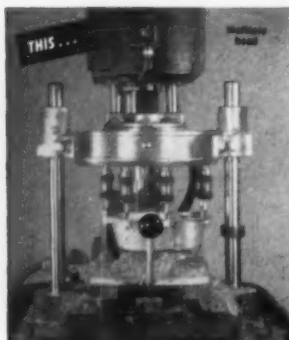
Let ETTCO help you **plan** on production drilling and tapping of small holes

Ettco-Emrick . . . at a realistic investment!

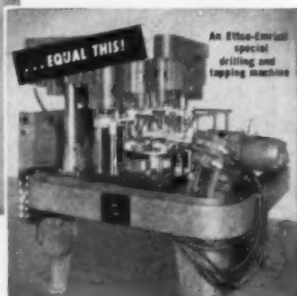
The only full line manufacturer of drilling and tapping equipment covering the entire small hole field

If you've discarded the idea of multiple drilling and tapping small holes because of heavy initial investment, that's another reason why it pays to plan with Ettco. Ettco-Emrick equipment is built of standardized "Unit-Engineered" parts and fewer parts — most of which are interchangeable and reusable elsewhere.

And since Ettco concentrates solely on the design and manufacture of small hole equipment, you can be sure the unit or machine recommended is *exactly* suited to the job; highly efficient, yet never expensively over-powered — thus realistically priced.



See these few examples of Ettco drill & tap planning



Typical of Ettco "Unit-Engineering": Standard multiple heads, work holding fixtures and famous "Tap & Drill Twins" can be assembled in any combination to make high production special purpose drilling and tapping machines at realistic prices. Use the Twins separately or in combination — single spindle or with multiple heads.

Let's prove it! Send us a sample part and information on your production requirements and we'll report immediately. Ask for our catalog, too. *Authorized Ettco distributors are ready to serve you.*



ETTCO TOOL & MACHINE CO., INC.

396 Johnson Avenue, Brooklyn 37, N. Y.

Chicago • Detroit • Los Angeles • Indianapolis

TAPPING ATTACHMENTS • MULTIPLE HEADS • DRILLING & TAPPING UNITS AND MACHINES
SPECIAL MACHINES • INDEXING FIXTURES • TAP & DRILL CHUCKS

Use postpaid card. Circle No. 254

MACHINE and TOOL BLUE BOOK

Good News

Norgren

for design
engineers

ANNOUNCES

and
PLANT
ENGINEERS

Important New Developments
in Compressed Air Filters
and Pressure Regulators



NEW Norgren Air Line Filters

- **LESS PRESSURE DROP** — larger passages and larger filter element.
- **BETTER LIQUID REMOVAL** — Improved lower plate and baffle design. Removes more liquid from the compressed air line.
- **CHOICE OF FILTER ELEMENT** — interchangeable filter elements, 74, 64, or 25 micron.



NEW Norgren Pressure Regulators

- **GREATER ACCURACY OF REGULATED PRESSURE** — balanced valve and increased effective diaphragm area provide improved accuracy over a wide operating range.
- **RELIEVING OR NON-RELIEVING TYPE AVAILABLE**
- **IMPROVED RELIEVING CHARACTERISTICS** — automatic relief of excess pressure. Holds system pressure close to regulator setting.

For complete information...

call your nearby Norgren Representative listed in your telephone directory—or

WRITE THE FACTORY FOR NEW CATALOG.

C. A. NORGREN CO.

3438 SOUTH ELATI STREET • ENGLEWOOD, COLORADO

Use postpaid card. Circle No. 255

NEW

INFORMATIVE DATA on STRIPPABLE PROTECTIVE COATINGS



Send for your copy now!

BISCHOFF CHEMICAL CORP.

126 MAIN STREET
IVORYTON, CONN.

Please rush details on Thermo-Cote.

Name

Company

Street

City State

Use postpaid card. Circle No. 256

District Managers MACHINE and TOOL BLUE BOOK

EASTERN DIVISION

Dan E. Reardon, V.P. in charge
c/o Hitchcock Publishing Co.
55 West 42nd Street
New York 36, N.Y.
Telephone: LACKAWANNA 4-4528

CONNECTICUT

Dan E. Reardon, V.P.
Box No. 1, South Glastenbury, Conn.
Telephone: MEEdford 3-7083

NEW YORK, N.J., MD., D. of C. EASTERN PA., DELA.

Raymond J. Sietsma
c/o Hitchcock Publishing Co.
55 West 42nd Street
New York 36, N.Y.
Telephone: LACKAWANNA 4-4528
Home tel: (Cedar Grove, N.J.) CEnter 9-4364

MAINE, N.H., VERMONT, MASS., R.I., LONG ISLAND, N.Y.

Donald J. Leverish
49 Standish Rd.
Stamford, Conn.
Telephone: Davis 3-6156

CENTRAL DIVISION

SOUTHERN COOK COUNTY, ILL.; SOUTHWESTERN OHIO, INDIANA

Henry J. Smith, V.P. in charge
c/o Hitchcock Publishing Co.
222 East Willow Avenue
Wheaton, Illinois
Telephone: WHeaton 8-3400

MICHIGAN, NORTHERN IND., NORTH- WESTERN OHIO

William E. Jacobs
18055 James Couzens Highway
Detroit 35, Michigan
Telephone: Diamond 1-9525

NORTHERN ILL., NORTHERN COOK COUNTY, WISC., MINN., UPPER PENINSULA of

MICH. & S. DAKOTA
Robert G. Bolinder
c/o Hitchcock Publishing Co.
222 East Willow Avenue
Wheaton, Illinois
Telephone: WHeaton 8-3400

WESTERN NEW YORK STATE, WESTERN PENNA., EASTERN OHIO

Ralph E. Helfrick
1507 Edgefield Road
Cleveland 24, Ohio
Telephone: Hillecrest 2-0180

WESTERN DIVISION

CALIFORNIA, ARIZONA

Keith H. Evans
3723 Wilshire Boulevard
Los Angeles 5, California
Telephone: DUnkirk 8-2981
and
593 Market St. (Room 816)
San Francisco 5, California
Telephone: YUkon 2-4280

OREGON, WASHINGTON

Lloyd Thorpe
531 Medical Arts Building
Seattle 1, Washington
Telephone: Main 6827

HITCHCOCK PUBLISHING CO.

• Telephone WH 8-3400 •
Wheaton, Ill.

FIRST CLASS
PERMIT NO. 272
WHEATON, ILLINOIS

BUSINESS REPLY CARD
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3¢ POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION

WHEATON, ILLINOIS

FIRST CLASS
PERMIT NO. 272
WHEATON, ILLINOIS

BUSINESS REPLY CARD
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3¢ POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION

WHEATON, ILLINOIS

January, 1957 For free information . . . use these postage-free Action Cards

Advertisements

Circle Key numbers

201	226	251	276	301	326	351	376	401	426	451	476	501	526	551	576
202	227	252	277	302	327	352	377	402	427	452	477	502	527	552	577
203	228	253	278	303	328	353	378	403	428	453	478	503	528	553	578
204	229	254	279	304	329	354	379	404	429	454	479	504	529	554	579
205	230	255	280	305	330	355	380	405	430	455	480	505	530	555	580
206	231	256	281	306	331	356	381	406	431	456	481	506	531	556	581
207	232	257	282	307	332	357	382	407	432	457	482	507	532	557	582
208	233	258	283	308	333	358	383	408	433	458	483	508	533	558	583
209	234	259	284	309	334	359	384	409	434	459	484	509	534	559	584
210	235	260	285	310	335	360	385	410	435	460	485	510	535	560	585
211	236	261	286	311	336	361	386	411	436	461	486	511	536	561	586
212	237	262	287	312	337	362	387	412	437	462	487	512	537	562	587
213	238	263	288	313	338	363	388	413	438	463	488	513	538	563	588
214	239	264	289	314	339	364	389	414	439	464	489	514	539	564	589
215	240	265	290	315	340	365	390	415	440	465	490	515	540	565	590
216	241	266	291	316	341	366	391	416	441	466	491	516	541	566	591
217	242	267	292	317	342	367	392	417	442	467	492	517	542	567	592
218	243	268	293	318	343	368	393	418	443	468	493	518	543	568	593
219	244	269	294	319	344	369	394	419	444	469	494	519	544	569	594
220	245	270	295	320	345	370	395	420	445	470	495	520	545	570	595
221	246	271	296	321	346	371	396	421	446	471	496	521	546	571	596
222	247	272	297	322	347	372	397	422	447	472	497	522	547	572	597
223	248	273	298	323	348	373	398	423	448	473	498	523	548	573	598
224	249	274	299	324	349	374	399	424	449	474	499	524	549	574	599
225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600

Inside Front Cover

Inside Back Cover

Back Cover

Inserts: 1A 1B 1C 1D 2A 2B 2C 2D 3A 3B 3C 3D

Company

Name..... Position.....

Street

City..... Zone..... State.....

January, 1957 For free information . . . use these postage-free Action Cards

Free Literature

circle key numbers

1	11	21	31	41	51	61	71
2	12	22	32	42	52	62	72
3	13	23	33	43	53	63	73
4	14	24	34	44	54	64	74
5	15	25	35	45	55	65	75
6	16	26	36	46	56	66	76
7	17	27	37	47	57	67	77
8	18	28	38	48	58	68	78
9	19	29	39	49	59	69	79
10	20	30	40	50	60	70	80

New Products

circle key numbers

81	91	101	111	121	131	141	151	161	171
82	92	102	112	122	132	142	152	162	172
83	93	103	113	123	133	143	153	163	173
84	94	104	114	124	134	144	154	164	174
85	95	105	115	125	135	145	155	165	175
86	96	106	116	126	136	146	156	166	176
87	97	107	117	127	137	147	157	167	177
88	98	108	118	128	138	148	158	168	178
89	99	109	119	129	139	149	159	169	179
90	100	110	120	130	140	150	160	170	180

Company.....

Name..... Position.....

Street

City..... Zone..... State.....



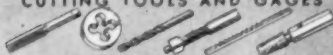
... make tracks

TO YOUR

Threadwell

DISTRIBUTOR

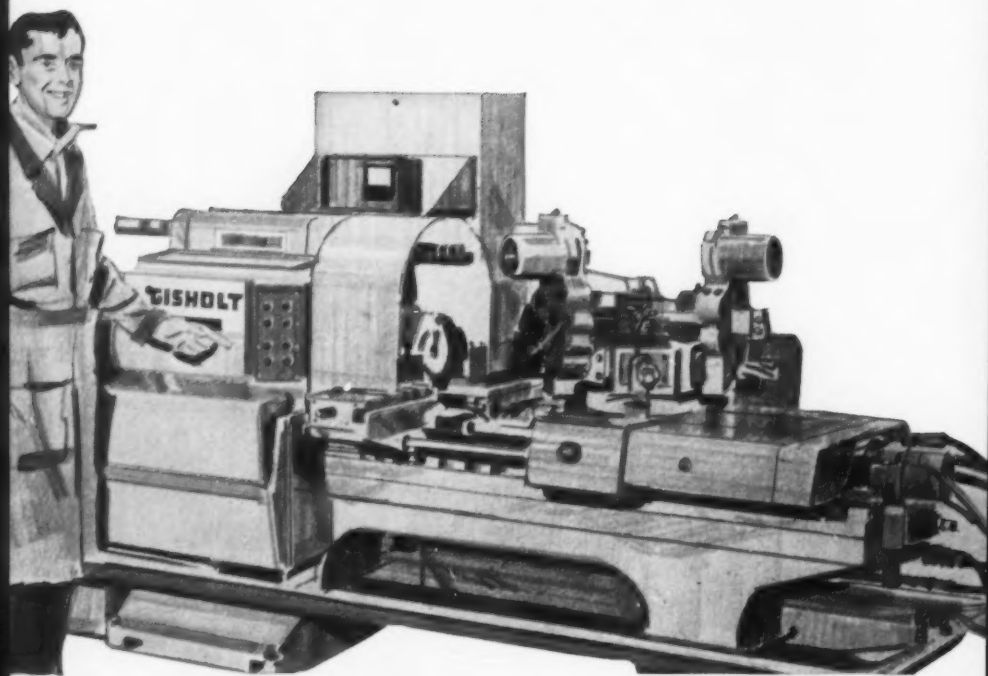
**FOR THE FINEST IN
CUTTING TOOLS AND GAGES**



Made by **THREADWELL**, Greenfield, Mass.

Use postpaid card. Circle No. 265

NEW Gisholt Fastermatic **CUTS YOUR SETUP TIME**



GISHOLT
MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.



Use postpaid card. Circle No. 266

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

control panel

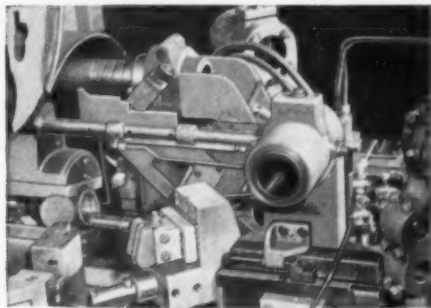
50% OR MORE

BY SIMPLY FLIPPING TOGGLE SWITCHES, your operators can cut setup time 50% or more with this electric control panel—one of the many advanced features available on the new Gisholt MASTER-LINE Fastermatic Automatic Turret Lathe.

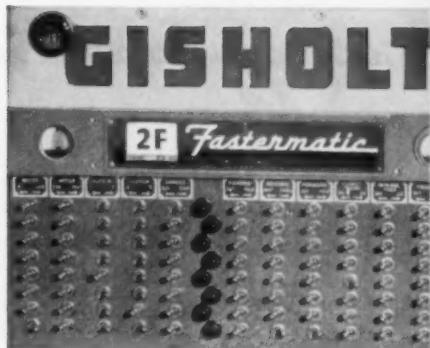
With a row of toggle switches for each turret face, the operator preselects desired machine functions. Reruns? He refers to a master reference card made from the previous run, and the machine is ready to go with minimum preparation. Feed changes are fast and easy. Tool overhang is quickly minimized by repositioning the saddle. Anywhere within the machine cycle, the operator can make a trial cut, withdraw the tools, make the part, reset the tools and resume forward feed.

What does this Fastermatic versatility mean to you? It means more time cutting chips, more profit per piece, less skill required of the operator, and freedom to handle additional units or do other work during machining cycles. It means you can utilize smart tooling and eliminate human errors...get record production on long runs...and also get the advantage of automatic cycle operation on relatively short runs.

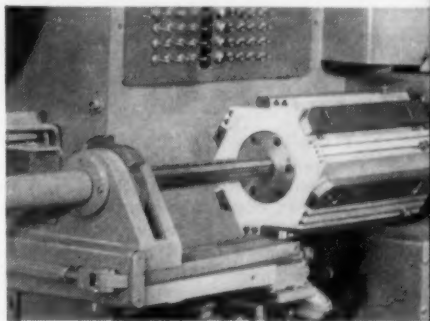
Ask your Gisholt Representative to tell you more about the new Fastermatic. Call him today—or write Gisholt for Bulletin No. 1179.



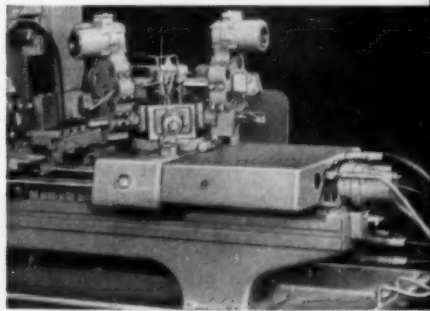
GISHOLT JETracer—mounts on any one of Fastermatic's turret stations. Provides exceptional accuracy for turning, boring or facing—either straight, taper or contour. Hydraulically operated; stylus follows contour of template controlling movement of single-point tool on sliding member.



ELECTRIC SETUP CONTROL PANEL—toggle switches govern basic machine functions, cut setup time in half. Master reference card cuts setup time still more on reruns.



HEXAGON FEED CONTROL DRUM—positioning adjustable flat bars on each face determines rate of feed. Thumbscrew actuator pins in slots on each face determine point of change from traverse to feed and length of feed.



TURRET SADDLE is hydraulically powered for indexing and longitudinal movement. Automatic cycle easily set up with turret double- or triple-tooled. Front and rear cross slides, operated by forward movement of turret saddle, work independently or together with any turret face.

VK

Set No. 84

GEAR MEASURING WIRES



Illustrated above is the newest Van Keuren Gear Wire Set No. 84

Set No. 84 is a multi-purpose set designed to cover a range of 26 diametral pitches from 2 to 80 with wires from each of four different and popular wire series:— 1.92, 1.728, 1.68 and 1.44. Because of duplication of wire sizes, this set which would normally involve 104 sizes reduces to 84 sizes. The economy here is evident.

The latest VK Gear Measuring Tables, available in Catalog and Handbook No. 36, have been arranged for use with all four of these gear wire series. Thus the set can be used in conjunction with the tables in many ways, such as:

Tooth Thickness } Measuring tooth thickness of internal and external spur gears, splines and variations.

Helical Gears } Measuring helical gears when normal diametral pitch is one of the 26 for which the set was designed.

Involute Profile } Checking involute profile by using more than one wire size. Series 1.92, 1.728 and 1.68 for externals. Series 1.68 and 1.44 for internals.

Enlarged Pinions & Reduced Gears } Measuring enlarged pinions and reduced gears. Tables are now available for the first time in VK Circular G38, giving measurement values and change factors for reduced gears which mate with pinions enlarged in accordance with the latest American Standard covering involute fine pitch gears.

Complete information regarding the use of gear measuring wires is contained in a fifty-page section of the VK Catalog and Handbook No. 36. Included in this section are the most complete gear measuring tables available, as well as all necessary formulas and equations for computing non standard spur and helical gears. Numerical examples are included. This book is available on request.

VK Gear Wires are held within .000025" for roundness and exact size. Surface finish is 1.5 RMS or better.

If complete coverage of all series is not necessary, sets covering single series such as 26 Ex. or 26 Int. are also available. See Catalog No. 36.

VK

38th YEAR

THE *Van Keuren* co.,

177 WALTHAM STREET, WATERTOWN, MASS.

Optical Flats . . . Light Wave Equipment . . . Light Wave Micrometers . . .
Gage Blocks . . . Wire Type, Taperlock and Trilock Plug Gages . . . Master
Setting Disks . . . Thread Measuring Wires . . . Gear Measuring Wires . . . Carbide
Plug Gages . . . Laps and Surface Plates . . . Precision Lapping Service.

Use postpaid card. Circle No. 267



DoALL



**Cuts Tool, Die, Gage and
Fixture Costs 15% or More
By Eliminating Surface Grinding!**

Air Hardening Tough Abrasive Jobs	Oil Hardening Proven Analysis
Carbon1.00%	Carbon0.90%
Manganese ..0.50%	Manganese ..1.20%
Chromium ..5.00%	Silicon0.30%
Molybdenum 1.25%	Tungsten ..0.50%
Vanadium ..0.30%	Chromium ..0.50%
	Vanadium ..0.20%

Size is accurate to: thickness—.001;
width—.005, —.000, with all edges
square to face within 10 minutes of
a degree! 25 micro inch RMS finish
or better!

FREE

Toolroom Wall Chart

Complete standard
size listing of all air
and oil hardening
Precision Ground
DoALL tool and
Die Steel . . . send
for it today!



Example: you need a 1" x 4" x 18" piece of
oil hardening steel. Remembering to order
it oversize so you can grind away 1/16" scale
and decarburizing on all surfaces, you specify
Hot Rolled Steel 1 1/8" x 4 1/8" x 18"—\$19.68.
You spend for grinding to size and overhead
\$12.00 (2 hrs. @ \$6.00 per hr.). Total cost,
\$31.68.

But, you can order the same piece, finished
ground in Precision Ground Tool and Die Steel
from DoALL for only \$26.79 and save \$4.89 . . .
with no danger of rejections and no wasted labor
and machining time.

. . . and DoALL Tool and Die Steel:

**Keeps ahead of scheduling . . . just ink it, mark
it, cut it!**

**Is easier to machine . . . saws to any shape on
a band machine!**

**Simplifies heat treating . . . non-deforming and
distortion resistant!**

**Prompt delivery . . . over 1500 standard sizes . . .
local stocks . . . fast delivery on special sizes!**

Save money on your tool and die jobs . . . see
your local DoALL Sales-Service Store or write for
further information:

The DoALL Company, Des Plaines, Illinois

TS-165R


**Band
Saws**
Machines and Blades


Surface Grinders


Power Saws

Call Your **DoALL** Service-Store

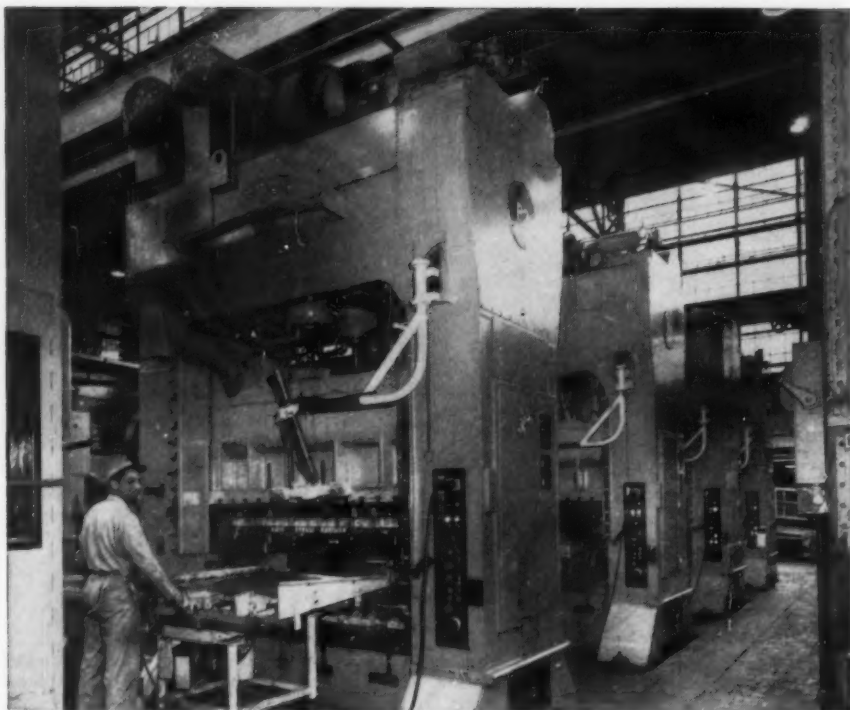

**DoALL
SAW
BANDS**


**DoALL
CASE MEASURING
INSTRUMENTS**


**DoALL
GRANITE
PLATE**


SHOP SUPPLIES

MACHINE TOOLS CUTTING TOOLS MEASURING INSTRUMENTS SHOP SUPPLIES IN STOCK



Dependable
CLEVELAND Presses
Hold Automotive
Stamping Costs Down!

These four Cleveland Presses recently installed at a leading automotive stamping plant are further testimony of the dependable performance built into every Cleveland Press. Their selection clearly indicates their ability to produce low cost stampings on high production schedules . . . indicates their ability to "stand up" under the demands of round-the-clock operation.

You, too, can earn extra profits by investing in new, more efficient Cleveland Presses. You'll find that the instant response and exact control made possible with the patented Cleveland Clutch speeds operation . . . reduces rejects. Their extra rugged construction assures reserve capacity . . . lasting slide alignment for continued accuracy. One of the 11 specialized types of Cleveland Presses is sure to be your answer to greater stamping economy. Write or call today!



POWER PRESSES - FABRICATING TOOLS

E. 40th & St. Clair Avenue, Cleveland 14, Ohio

Offices at: NEW YORK • CHICAGO • DETROIT

PHILADELPHIA • KANSAS CITY

CITY FOUNDRY DIVISION - SMALL TOOL DEPARTMENT



Use postpaid card. Circle No. 269

MACHINE and TOOL BLUE BOOK

AVOID the
HIGH COST
and difficulty
of fabricating
long, hard
& straight parts
by conventional
methods...

THOMSON

60 Case

hardened and ground

SHAFTS, ROLLS, GUIDE RODS and other long-round parts

60 Case is the result of over ten years of experimental work and production experience with hardened and ground shafts which are a requirement for BALL BUSHINGS, the Linear Ball Bearing manufactured by Thomson Industries, Inc.

The special techniques and equipment that have been developed enable high production rates and low handling costs. This permits big savings over conventional methods which are plagued with erratic warpage, straightening and resultant grinding problems. Finished 60 Case parts frequently cost less than the scrap losses that result from conventional methods.

60 Case material has a surface hardness close to 60 on the Rockwell C scale which is essential to resist wear.

Long lengths of material ranging in diameter from 1/4" to 4" are stocked to enable prompt shipment of 60 Case parts, with or without special machining.

ADVANTAGES of 60 Case

- COST REDUCTION
- HARD BEARING SURFACE
- ACCURATE DIAMETERS
- GROUND FINISH
- STRAIGHT PARTS
- DELIVERY FROM STOCK
- ADDED STRENGTH
- UNIFORM HIGH QUALITY

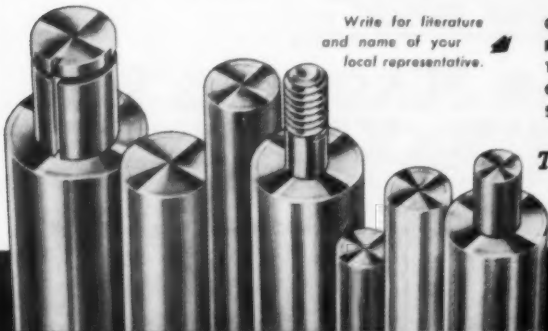
TYPICAL 60 Case PARTS

GUIDE RODS, SHAFTING, ROLLS, TRAVERSE
RAILS, PISTON RODS, ARBORS, LEADER PINS,
TIE RODS, KING PINS, AXLES, CONTROL RODS,
GUIDE POSTS, MANDRELS, BEARING ROLLERS,
SPINDLES

THOMSON INDUSTRIES, Inc.

Dept. C2, Manhasset, New York

Write for literature
and name of your
local representative.



Serving the Industry Since 1852



WOODS SHAFTLESS MOTORS



The application of direct motor drive with WOODS' Shaftless Motors to high-speed spindles brings the peak of motive efficiency at relatively small cost. Conserves space—eliminates belts and gears—fewer wearing parts. The extensive and varied lines of WOODS' Shaftless Motors are available for nearly every class of direct application.

Let us tell you how you can achieve a reduction in production costs by direct motor drive.

MOTOR DIVISION

S. A. WOODS MACHINE CO.
27° DAMRELL STREET
BOSTON 27, MASS.

Use postpaid card. Circle No. 271

Why the Contract Shop Owner Prefers **PRODUCTO** Die Sets



They help protect his profits

The contract shop owner prefers Producto die sets because they help protect his die performance...his delivery promises...his profits.

The shop owner favors Producto because he can choose from a wide range of die set styles and thicknesses in steel, semi-steel or a combination.

He knows that when his dies are mounted in Producto sets, they will retain the precision built into them. He can expect maximum die life, maximum production with minimum press downtime for regrounding.

The shop owner likes the fact that Producto offers him a choice of two classes of precision, and that *he pays only for the amount of precision he buys.*

He knows that whoever handles the die will spend the least possible time taking it apart and putting it together because Producto's Qwik-Fit Guide Pins minimize die set assembly problems.

Most important, the shop owner can depend on

efficient Producto service and strategically-located Producto distribution centers to protect the delivery promises he makes to *his* customers.

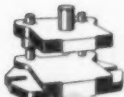
When the contract shop owner thinks in terms of protecting his profits, he thinks of Producto die sets and accessories. You should, too.

NEW DIE SET CATALOG No. 11 is another reason the shop owner prefers Producto. It makes selection and ordering really easy. Write for your free copy today. And ask to receive Die Set Digest, too.



THE PRODUCTO MACHINE CO.

960 Housatonic Ave., Bridgeport 1, Conn.



PRODUCTO

Wherever die sets are used

PRODUCTO

PRODUCE MORE WITH PRODUCTO PRECISION DIE SETS

Use postpaid card. Circle No. 272

FLAME HARDENED GEARS

size is not the
important factor
when you need flame
hardened gears

we flame harden
gears from 2 oz.
to 80,000 lbs.

2 OUNCES



34,000 POUNDS

let us help you . . . from design
to completed machine

DETROIT



flame hardening co.

17644 Mt. Elliott Avenue • Detroit 12, Michigan • TWInbrook 1-2936
Use postpaid card. Circle No. 273

There's never a "leave-off" mark . . .

Over-all capacities:

Model 22-23S —

1/8" to 1" ANPT

Model 24-25S —

1" to 2" ANPT



. . . with the new J & L
Taper Receding Die Head

Now you can cut precision taper pipe, *dry seal*, and other taper threads to all standard specifications — *without* chaser "leave-off" marks.

J & L's new Taper Receding Die Head is *full* receding.

Only the chamfered teeth and the first full tooth in the chaser set do the cutting. Pressures on the chasers are much less than those resulting from "form" or "jam" cuts. And cutting action is the same as that of straight threading. You get smoother threads — no "leave-off" lines — longer chaser life.

These new Taper Receding Die Heads also feature simple, controlled set-up and automatic operation. Write for form #5430.

JONES & LAMSON

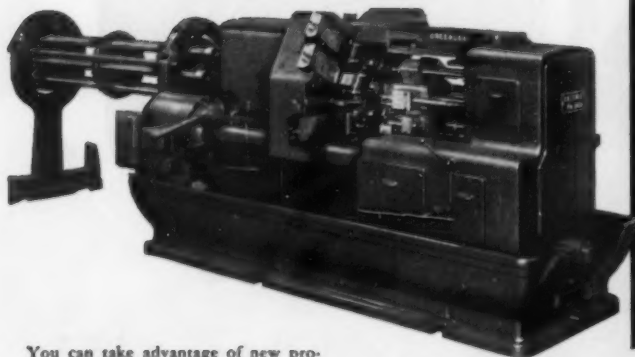
JONES & LAMSON MACHINE CO., 520 Clinton St., Dept. 710, Springfield, Vt., U.S.A.



*Class III Guaranteed
Not Sometimes, but Everytime!*

THREAD TOOL DIV.

now... greater accuracy, faster production



WITH
GREENLEE
SIX-
SPINDLE
AUTOMATICS

You can take advantage of new production techniques...attain higher levels of efficiency with the improved Greenlee 6-Spindle Bar Automatic. Its advanced design opens the door to some real profit opportunities. • These design improvements are fully described in a catalog recently issued. Let us send you a copy today. Find out how Greenlee Automatics can save time and money in your plant. It will pay you to investigate.

IMPROVED SPINDLE CONSTRUCTION

The spindle has been completely redesigned to assure greater accuracy at higher speeds. True running... the new Greenlee spindle has five widely spaced, preloaded, angular-contact, precision ball bearings. Entire spindle is dynamically balanced for smooth operation. Metallic seals, labyrinth and friction washers with line contact provide maximum heat dissipation.

INCREASED SPEED

Spindle speed range has been increased. Enables you to take full advantage of the top efficiency and peak performance which carbide and high-speed tooling offer. Reduces downtime losses and tool costs.



WRITE FOR
CATALOG
No. A405

GREENLEE

GREENLEE BROS. & CO.
1831 Mason Avenue
Rockford, Illinois

Use postpaid card. Circle No. 275

the **MASERATI**

SIZES

2

3

4

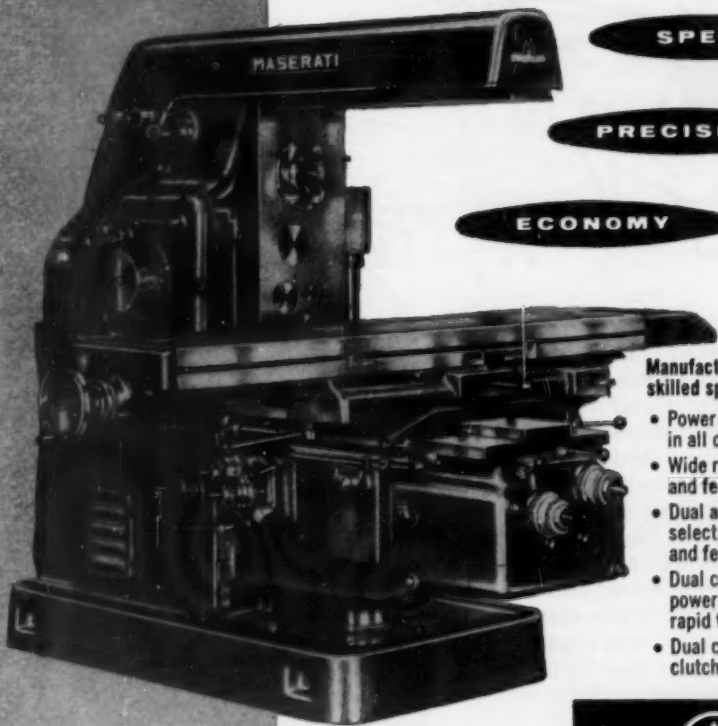
M HORIZONTAL & VERTICAL **ILLING MACHINES**

POWER

SPEED

PRECISION

ECONOMY



Manufactured by highly skilled specialists

- Power rapid traverses in all directions
- Wide range of speeds and feeds
- Dual automatic selection of speeds and feeds
- Dual controls for all power feeds and rapid traverses
- Dual controls for clutch and brake

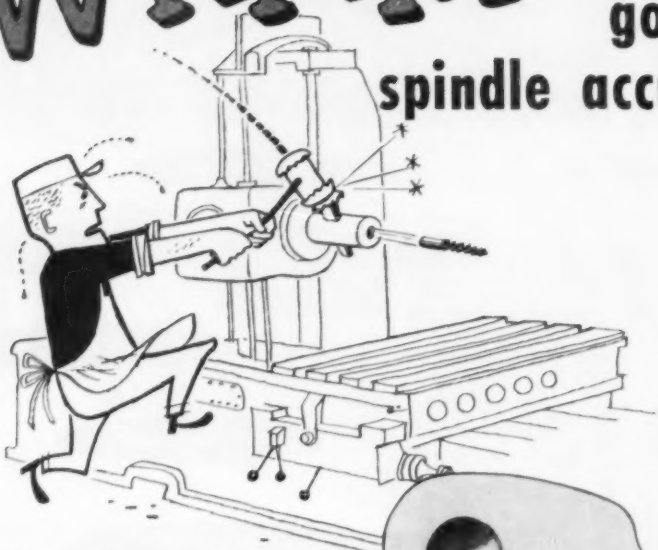
COMPLETE INFORMATION AVAILABLE

Write for Detailed Specifications Today
DISTRIBUTORS IN PRINCIPAL CITIES
Dept. B Maserati Corporation of America, Westbury, N.Y.

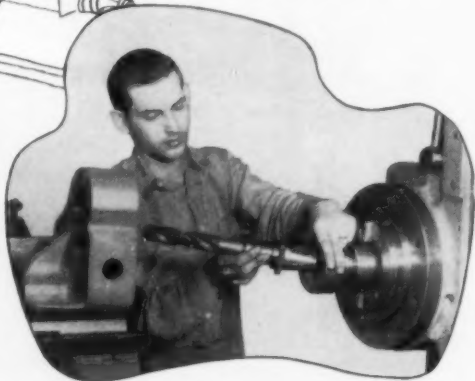


Use postpaid card. Circle No. 276

WHAM and there goes spindle accuracy



Our illustrated "character" is about to ruin spindle accuracy with a hammer and drift key that cost a lot of money to get in the first place. Modern P.D.Q. tooling can eliminate this abuse . . . and save time and money as well. A quick one-sixth turn of the holder nut releases the adapter and you're ready for the next operation . . . it's as easy as that. How about those machine tools in *your* plant? Get the facts on P.D.Q. tooling . . . Write for complete information.



Representatives in principal cities.



PORTAGE Double-Quick, Inc.

1037 SWEITZER AVENUE • AKRON 11, OHIO

FEATURES THIS MONTH

MACHINE AND TOOL

blue book

A first hand report of German production methods of today is reported by William F. Schleicher, Hitchcock's vice-president and editorial director, after an extensive trip through West Germany. His report takes you on the inside to show how Germany is slowly rebuilding its industrial centers, and again trying for its share of the world market.

Page 103

Round-up of Washington News. This department tells how the new Congress intends to further attempt to award government contracts to small business. The Small Business Administration and the U.S. Dept. of Commerce recently announced their intentions to increase the volume of contract awards to small firms.

Page 87

Do you have a parts obsolescence Problem? Be sure and get the lowdown on Kaiser Steel's dollar-wise preventive obsolescence program that reduced its maintenance spares inventory by \$1,000,000 in 1955, yet at the same time all but eliminated outages in any parts category. These figures, scaled to the average plant, would mean a \$5000 parts stock slashed by \$600.

Page 114

5-1/2 inch long holes are drilled at 120 pieces per hour with a Starbore drill on a standard No. 112-C Ex-Cell-O precision boring machine. The drill on this automated boring machine is fed at the rate of 15 ipm to produce 7/16" diameter holes in cast iron valve guide bushings.

Page 126

News of Automation. A new 27-station Natco transfer machine makes it possible to process two sets of bearing caps at once. This machine automatically loads two bearing cap castings, performs 80 operations on 240 complete sets per hour and automatically feeds assembly conveyor.

Page 129

Producing rolled contoured wing skins with a standard Onsrud radial arm router, modified for adjustment of the router head to any vertical setting within machine limits with finger tip control.

Page 136

Ceramic tools were the answer to increased production in machining sliding gears at Ford's standard transmission and radiator plant in Dearborn, Mich.

Page 140

Labor Relations. Can you fire a man for trying to get another worker to slow down? You'll find the answer to this question and two other problems that may arise in your plant in the "How Would You Decide" section.

Page 145

COMMON SENSE says it's better...

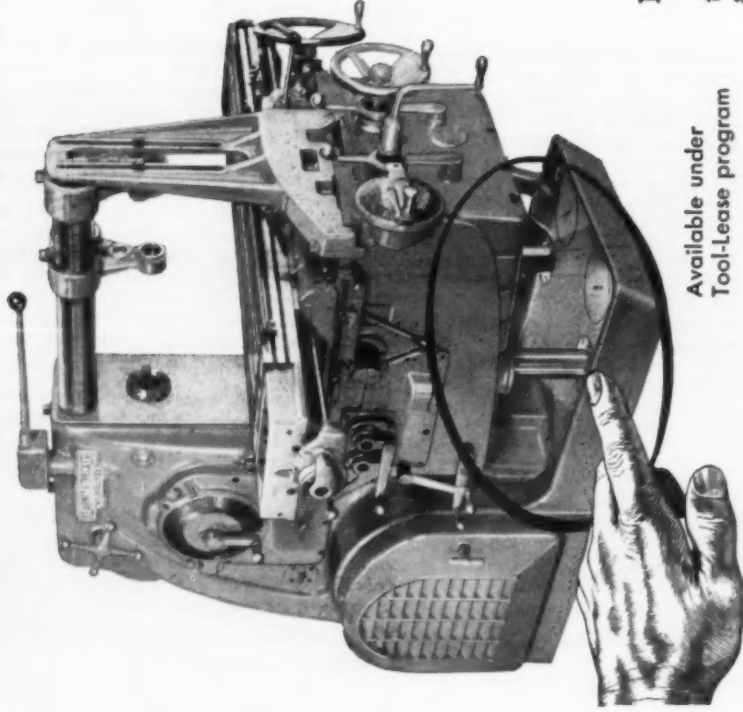
Twin Screw Knee Support

Think it over... twin screw knee support
is the one really new basic advancement in
knee type milling machine design in years.

And only Kearney & Trecker
new **TF** Series machines have it!

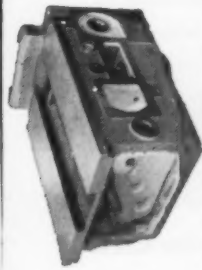
Here's why it makes sense.

Because the *twin screw* design distributes most effectively the weight of much larger, heavier knees, saddles and tables, it fulfills today's requirements for higher speeds, feeds and power — greater machine capacity. What's more, this *balanced design* substantially increases stability under heaviest loads, offers greater



Available under
Tool-Lease program

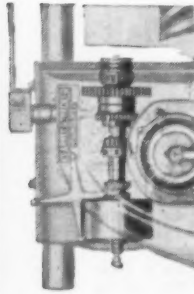
5 more reasons why **TF** Series milling machines



Heavier, Wider, One-Piece Knee—The TWIN SCREW arrangement supports the heavier, larger knee. Span and length of ways is increased considerably, providing fuller saddle support . . . lasting accuracy . . . substantial reduction of way and gib wear.



Double "Vibra-Void" Overrams—Two solid steel bars, mounted completely through column, void vibration at source, afford more rigidity and resistance to deflection than any other type support. Design also greatly simplifies changing of arbors and cutters.



Three-Bearing Spindle—Complete assembly consists of three heavy-duty bearings, flywheel, a train of wide-faced forged steel gears. Rigidity of spindle unit contributes to increased cutter life, better finish and quieter operation.



"Front-Trol" Operating Convenience—Front-mounted controls include feed selection, Mone-Lever table feed and rapid traverse, automatic cycle table feed and rapid traverse controls, table handwheel, saddle clamping gib and backlash eliminator. Machines have 2" dia. table feed screw.



Massive Column—Solid back, double-box section column is scientifically ribbed throughout to rigidly withstand heaviest cutting forces. Full bearing column face affords maximum support for the knee. Cross-mounting meter assures maximum ventilation, easy access for routine maintenance.



KEARNEY & TRECKER CORP.

6796 W. National Ave., Milwaukee 14, Wisconsin

Please send me Catalog No. TF-50 with details on new line of TF Series Plain, Universal and Vertical milling machines.

Name.....

Title.....

Company.....

Address.....

City.....Zone.....State.....

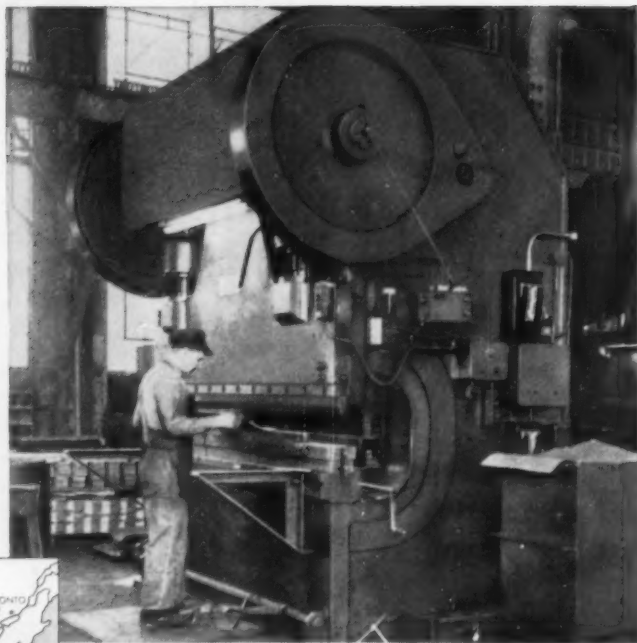
KEARNEY & TRECKER
MILWAUKEE®

BUILDERS OF

PRECISION AND PRODUCTION MACHINE TOOLS SINCE 1898

Use postpaid card. Circle No. 278

Installed in the Chicago plant in 1948, this 260 ton capacity machine, Model 14½ 6, forms the smaller and lighter gauge conveyor panels. Illustrated is a curved section being formed of ½" plate to a radius of 8".



STEELWELDS Serve Link-Belt Plants From Coast-To-Coast

NINE LINK-BELT Company plants located from California to Pennsylvania, Texas to Ontario, Canada, and in Transvaal, South Africa, have one to six Steelweld Presses and Shears. Nearly every year since 1944 more Steelwelds have been purchased. Slightly over half of the machines are shears.

As a large manufacturer of a wide variety of conveying and processing equipment such as apron, screw, oscillating and overhead chain trolley conveyors, railroad car dumpers, bucket elevators and other handling equipment, Link-Belt

plants must shear and form a great amount of steel plate. From experience, Link-Belt has learned that Steelwelds are outstanding for this work.

There are several reasons for this. For instance, the accessibility of controls and ease of making adjustments. The all-around solid construction that permits continuous operation with hairline accuracy. The heavy, well designed machinery which requires minimum maintenance.

Like Link-Belt, when you really get to know Steelweld Bending Presses, you, too, will be elated with their performance.



GET THIS BOOK!

CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

5263 East 281 Street • Wickliffe, Ohio

STEELWELD BENDING PRESSES

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

Use postpaid card. Circle No. 279

MACHINE and TOOL BLUE BOOK

LETTERS TO THE EDITOR

MACHINE AND TOOL

blue book

While reading the Shop Hints in your May 1956 issue of MACHINE and TOOL BLUE BOOK I came across the article written by Alex S. Arnott, titled "Center Angle Gauge," on page 172. This article caught my attention immediately upon turning the page because of its similar nature to a type of gage that we have been using in our shop for quite some time for the gaging of length dimensions of Gear-Box Caps.

This type of gage is one which can be utilized for a great many different gaging problems by simply adapting the gage pin contours to the gaging problem encountered.

I might also mention that I am a very faithful reader of Machine and Tool Blue Book, and also of Mr. Arnott's, and I look forward each month to read the interesting and useful articles found in your magazine.

Frank L. Rush
Box 511,
Columbus 15, Ohio

Error in Pagination

We should like to draw your attention to an error in pagination which occurs in the July 1956 issue.

The article involved is entitled "How to Get More and Better Holes From Your Twist Drills" and in the copy we have, the text on page 120 does not follow on from page 118. The subject is the same, but it appears that either a page is missing, or a fairly big part of one. Page 119 of course, is concerned with an advertisement.

We are rather anxious to see a complete copy and would be glad therefore if you could send one by return of post.

V. C. WATTS, LIBRARIAN
PRODUCTION ENGINEERING
RESEARCH ASSN. OF
GREAT BRITAIN
Leicestershire, England

Many of our readers have noticed this error and told us about it. If you will take the top line of page 120 and cross it out and start reading on the second line of page 120 on the left hand side, you will see the article begins to make sense again. Thanks for telling us!

Query from Finland

Many thanks for your letter of September 21 in connection with the inquiry from Wartsila-Koncernen A/B, Helsingfors, Finland.

We have already replied to this inquiry in connection with correspondence received directly from Wartsila-Koncernen A/B in Finland.

Thank you again for your interest in this matter.

C. D. NORTON
Chicago, Ill.
ACME STEEL CO.

Spark Erosion Machining

Would you please send any literature which you may have on Spark Erosion Machining.

The September issue of your publication features an article on page No. 142, on the Abaco Machine.

We are particularly interested in any further information, such as literature or prices, that you can supply on this machine.

JOHN E. BLES
CINCH MANUFACTURING
CORPORATION
St. Louis, Missouri

Sorry we have no further literature on this subject. Suggest that you write to:

ABACO INDUSTRIES
ELMHURST,
LONG ISLAND, N. Y.

Ceramic Tools

In the October issue of MACHINE and TOOL BLUE BOOK, we were interested in the article on ceramic tipped tools by the Raybestos-Manhattan, Inc. Company.

As there was no address published in the advertisement, we would appreciate your either advising us the address of the company or your forwarding our name to them and having them contact us . . . We are interested in learning more about ceramic tipped tools.

JESSE R. CAIN
GENERAL ELECTRIC & MA-
CHINE WORKS
Millville, N. J.

Forwarded your letter to Raybestos-Manhattan, Inc., 61 Willett Street, Passaic, New Jersey. Following letter received:

Your letter of November 12 to our Passaic plant has been forwarded to this office Would you kindly note on your records of inquiries that anything in connection with ceramic tools is to be forwarded to this plant (Raybestos-Manhattan, Inc., Bridgeport 2, Conn.) and not to the Passaic plant.

JEROME W. BRUSH,
Manager Special Prdts.
Raybestos,
Bridgeport, Conn.

REPRINTS AVAILABLE

The following free reprints are available upon request as long as supply lasts.

1. **Discharge Machining . . . Can it Save You Money?** by P. Ianitelli.
2. **Flexible Reinforced Wheels** by Richard C. Bush.
3. **"Bouncing Ball" Method of Indication Inspects Irregular Cam Contours**, reprinted from Machine and Tool Blue Book.
4. **How Douglas Solved Its Deep Hole Drilling Problems**, by A. R. Felando.
5. **Can Powdered Metallurgy Save You Time and Money? Yes . . . Here's How!** by Samuel Bradbury, III, and George Karian.

Available at 35c per copy are:

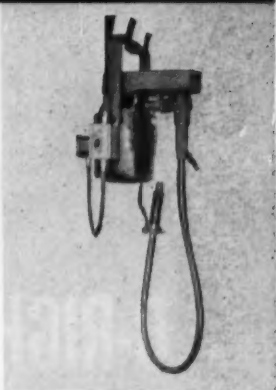
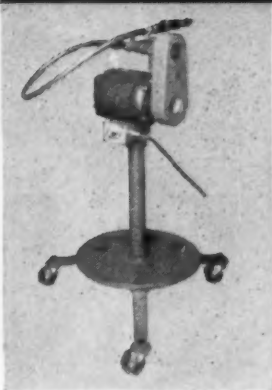
1. **Centerless Grinding** by Editorial Staff of GRINDING and FINISHING.
2. **Organizing and Operating a Precision Barrel Finishing Department** by Morris S. Shipley and William A. Biebel.

R. G.

haskins

Co.

FLEXIBLE SHAFT MACHINES



faster

Haskins machines will speed production on a big variety of metal-working jobs with their continuous speed and unerring performance. And there's no need to worry about changing tools—it takes just seconds to switch to any one of the numerous metal-working attachments in the Haskins line. *Use Haskins equipment and eliminate interruptions.*

easier

Haskins flexible shaft machines make the whole operation a simple matter. They're portable—ready to go to work in whatever spot you choose, even remote sections of your plant. Operators say Haskins machines are easy to use because they have to hold only the lightweight handpiece which permits greater accuracy for close, precision work. You should know about Haskins flexible shaft machines and accessories—*leaders in their field for over 30 years.*



Write Today for a Catalog and Literature

R. G. HASKINS Co.

2645 West Harrison Street

Chicago 12, Illinois

Use postpaid card. Circle No. 280

January, 1957

85



B-RIGHT-ON[®]

SOCKET SCREW PRODUCTS

always measure up!



Socket screw users who want *what* they want *when* they want it know it pays to specify B-RIGHT-ON! Brighton Socket Screw Products *always* measure up.

Standard or special, Brighton Screws must meet and pass factory standards that are higher even than those specified by the ultimate user of the screws. Rigid control, from initial steel selection to final packaging, certifies every screw as B-RIGHT-ON quality.

Selected mill supply houses, Brighton distributors, complete the control chain, assure the user of service and delivery as dependable as the screws . . . B-RIGHT-ON service.

Write for descriptive literature . . . see how

**YOU CAN DO BETTER WITH
B-RIGHT-ON.**

**THE BRIGHTON SCREW
& MANUFACTURING CO.**

1839 READING RD., CINCINNATI 2, O.

ROUND-UP OF WASHINGTON NEWS

MACHINE AND TOOL

blue book

Output of the nation's factories and mines in October rose to 150% of the 1947-49 average, according to the Federal Reserve Board. This is three points higher than October, 1955 and four points up from September, 1956.

New orders placed with manufacturers in September totaled \$28.2 billion, \$1 billion under August and \$500 million under September, 1955. Unfilled orders of manufacturers, Oct. 1, totaled \$62.3 billion, which is up \$9.3 billion from Oct. 1, 1955.

Step-up Aid to Small Business

Further attempts to boost small business' share of government contracts will receive high priority from the new Congress.

The Small Business Administration and the U.S. Dept. of Commerce recently announced joint action to increase the volume of Commerce Dept. contract awards to small firms. Each year the various units of the Commerce Dept. purchase about \$175 million of goods and services of all types. While small firms already receive a substantial share of these purchases, this cooperative program should result in still greater opportunity for small business firms to supply the Department's needs.

Under the new agreement, representatives of SBA will be assigned to major buying centers of the Department of Commerce to review proposed purchases with contract officials and to determine which ones shall be set aside for exclusive competitive award to small business concerns. The Small Business Administration will provide the Dept. of Commerce with the names of additional prospective small business bidders on industrial purchases and will be given the opportunity to recommend qualified small firms for inclusion on appropriate bidders lists.

Small business firms that are squeezed for cash can expect more direct credit relief from the government. Faster action on direct and

bank-participating SBA loans will be forthcoming as local SBA offices are authorized to approve loans—where banks participate up to 25% of the total—of sums up to \$100 thousand without referring such loans to Washington.

Administrator Wendell B. Barnes of the Small Business Administration announced that in the first four months of this fiscal year \$215 million in Federal purchase orders had been set aside for small business. This is up \$91 million for the same period the previous year.

Outlook for 1957 Tax Cut

The odds are that the various excise taxes, the corporate rates and individual income taxes will stay at present levels for at least another year. The Treasury Department wants a delay in the scheduled April 1 cuts, which amount to \$2.9 billion in revenue for the excises and corporate rates, for these reasons:

1. The Middle East situation

will cut deep into anticipated surpluses.

2. Increased spending will continue through 1957, and Washington is worried about inflation.
3. The proper time to bring about a tax cut is when business turns downward.

The big struggle between the GOP and the Democrats is expected to come in 1958 when the latter will push hard for income tax cuts in the lower income bracket and the GOP will hold out for cuts from one end of the income scale to the other.

Navy Dept. Has Plan To Alleviate Shortage of Engineers

The work-study plan created by the Navy Department to alleviate the shortage of engineers and scientists is worth the consideration of businessmen and industrialists faced with the same problem.

There are several phases to the

Steelmaking Equipment Needs Reconditioning. Some steel-making equipment has been subjected to minor breakdowns due to the pace of catching up with orders since the strike. Because of the need for reconditioning, a lower level of output is anticipated. The industry must be ready for the increased demands for cold rolled sheets by the automobile companies during the first quarter of 1957.



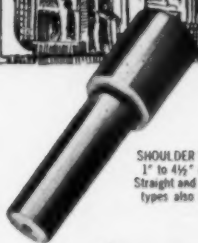
**"More than
TWENTY MILLION HITS
since we changed to Lamina
Guide Pins and Bushings!"**

"Since changing to Lamina Guide Pins and Bronze-plated Bushings on our dies, they have run more than 20,000,000 hits . . . and they're still going! Formerly, the best we could get was 4,000,000 to 5,000,000 hits on any make." *This is a typical quotation from an actual user letter.*

Lamina bronze-plated wring-fit bushings are pre-finished on the I.D. Seated on a shoulder square with the die shoe surface and secured by special retainers, they assure distortion-free, full bearing surface that results in better die alignment, less maintenance and longer die life.

Lamina Guide Pins are special tool steel, heat treated, spray quenched, hardened, ground and burnished. The uniform, hard surface resists wear, while the tough core won't bend in installation or use. These dimensionally accurate pins do not "mushroom" or get out of round, and require no "running in."

There is a size and type Lamina Guide Pin and Bushing for every need. Our new catalog shows illustrations, applications, dimensions and prices of more than 800 items. Ask your die set supplier, or write us for your free copy now.



SHOULDER TYPE PIN.
1" to 4 1/2" diameter.
Straight and Removable
types also available.



LONG SHOULDER Bronze Plated Bushing
contains pin during entire stroke. 1/4"
to 3" I.D.



NUT TYPE Bronze Plated Bushing for
wide range of requirements. 1" to 2" I.D.

Lamina
DIES AND TOOLS, INC.
P.O. BOX 31, ROYAL OAK, MICHIGAN

SPECIAL PINS AND BRONZE-PLATED BUSHINGS for any application
... tailored to your requirements. Send prints for prompt quotation.

Navy plan. In some cases, the Navy hires promising high school graduates as civilian employees. Here the starting salary is \$2,960 a year. Other high school graduates can attend college parttime and work for the Navy the remainder of an eight-hour day. If the student so desires, arrangements can be made to attend college full time for a quarter of the year and then arrange his schedule so that he works full time for the Navy during the next year.

The Navy pays a portion of the tuition, fees, etc. in addition to a salary to the student-worker. The only stipulation in addition to meeting the necessary qualifications is that the worker-student agree that he will work later on for the Navy for a period at least equal to the time he spends under the program.

Social Security Taxes To Rise $\frac{1}{4}$ Percent

With Social Security taxes due to rise from 2% to 2 $\frac{1}{4}$ percent in January, 1957, many of your employees will not be aware of the fact and will wonder why the added deduction was made.

To save wasted time, it is suggested that the questions arising be met with a leaflet enclosed in the first paycheck envelope ex-

plaining the higher deduction and subsequent higher benefits.

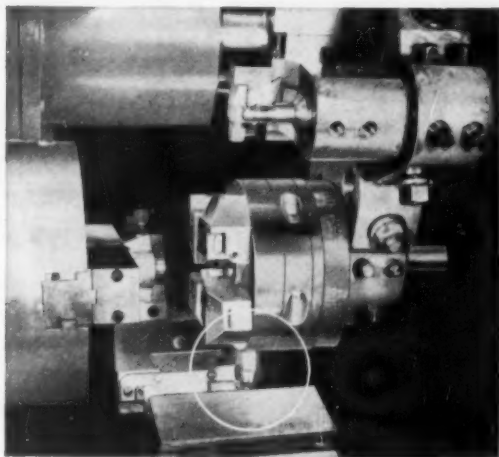
Jan. 20 Falls on Sunday; Ike to Say Oath Twice

Because President Eisenhower's first term ends at noon on Jan. 20, 1957, a day which falls on Sunday, he will take the oath both on this day and again on Jan. 21, which is the public Inauguration Day.

The oath will be taken on Sunday in the presence of Chief Justice Earl H. Warren and Mrs. Eisenhower. On Inauguration Day Ike and Chief Justice Warren will repeat the ceremony before thousands in the Capitol Plaza.



Automatic Threading for Automatic Chucking Machines



The adaptability of Landis Heads is again proven by this application of a LANDMATIC Head on a #1AC Warner & Swasey Automatic Chucking Machine.

Normally, the LANDMATIC applied to turret lathes is self-opening and closed manually. To adapt this stationary head for automatic operation on the Automatic Chucking Machine, only two steps were required: (1)—the addition of a closing roller in place of the handle, and (2)—the use of special closing pins which provide overtravel, eliminating the need of a complicated, accurately-set closing cam. This adaptability has paid off for

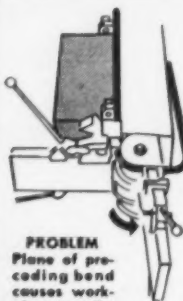
the S&C Electric Company, Chicago, Illinois, manufacturers of high voltage protective equipment.

In addition, this head through the use of long life tangential chasers offers lower tool cost and less down time. For example—when threading the workpiece shown, a contact ferrule of 85-5-5-5 cast red brass requiring a $1\frac{3}{8}$ "—16 pitch UN thread $\frac{3}{8}$ " long into a $\frac{1}{16}$ " relief, complete runs of over 3,000 pieces are made without grinding the chasers. The 2" Head, shown here, will normally thread all diameters from $\frac{3}{8}$ " to 2", with oversize capacity up to $3\frac{3}{4}$ ". For more information, ask for Bulletin F-90.

385

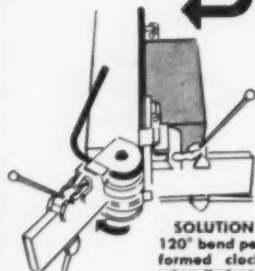
LANDIS Machine CO. WAYNESBORO
PENNSYLVANIA

You can eliminate problems of WORKPIECE INTERFERENCE with PINES 2-in-1 BENDER

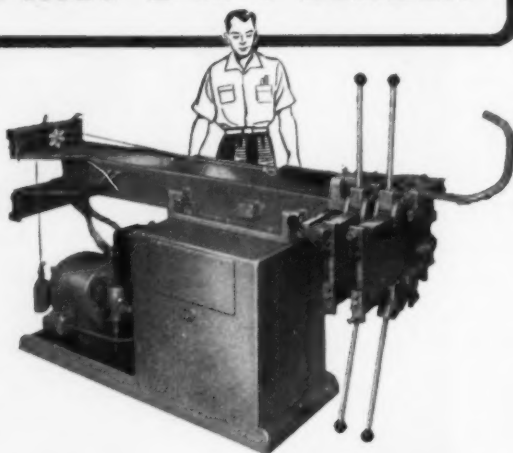


PROBLEM
Plane of pre-
ceding bend
causes work-
piece to strike
machine.

**HINGED
TOP
ASSEMBLY**



SOLUTION
120° bend per-
formed clock-
wise eliminates
interference.



Pivoting Head Design Permits L.H. and R.H. Operation

● This new, small, compact Pines Bender for production, experimental, or small lot bending work is actually two machines in one. It's designed with a pivoting head and top assembly and double ways which permit fast, efficient handling of bending operation in either clockwise or counter-clockwise direction. Changeovers can be made in two minutes. You save time and reduce work handling where multiple planes and odd workpiece shapes cause interference on ordinary machines. These exclusive features permit double tooling setups, fast, accurate bending results.

300-400 Bends Per Hour

Typical production rates average 300-400 bends per hour, and the machine is powered to handle work up to 1" O.D., 16-gauge (.062") steel tubes, 3/4" bar stock, or equivalent in continuous production. Economical tooling features make it an ideal unit for tool room or experimental department work as well as for medium production.

- **DEPENDABLE HYDRAULIC OPERATION**—complete self-contained system.
- **HIGHLY VERSATILE**—will bend tubing, bars, angles, channels, extrusions.
- **ECONOMICAL TOOLING**—interchangeable for both R.H. and L.H. bends.
- **COMPACT, RUGGED**—occupies 3'6" x 8' floor space. Cast steel nose, heavy-duty bearings.
- **EASY OPERATION**—simple toggle clamping, convenient controls.

PINES ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery 690 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

Write
For
**FREE
DATA**



Write for complete data on this new Pines 2-in-1 machine or ask for a Pines sales engineer who will assist you with any bending problem.

Use postpaid card. Circle No. 284

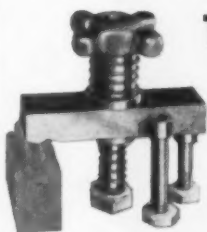
MACHINE and TOOL BLUE BOOK



for ALL WORK HOLDING NEEDS

• • •

TOGGLE CLAMPS



**NEW
SWINGLOCK**
faster, because
operated by ONE
HAND.

39 TYPES & SIZES

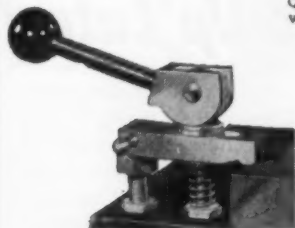
NOTE These Features: Reamed
holes—hardened serrated bush-
ings—high tensile strength rivets.

TOGGLE PLIERS

NEW-TOGGLE PLIERS with
QUICK TRIGGER RELEASE,
working in both directions.



**TOGGLE
PLIERS**

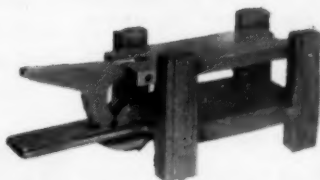


FIXTURE CLAMPS
16 STYLES—159 SIZES



COMPONENTS
1000 TYPES & SIZES

WRITE
FOR
CATALOGS



LEAF JIGS
28 SIZES—1½"x2" to 6"x6"

WEST POINT MANUFACTURING CO.
26943 W. 7 MILE ROAD, DETROIT 19, MICHIGAN

All Tool Steel Looks The Same



The Difference Shows Up Later!

PRK-33—Air Hardening, Non-Deforming Cobalt, High-Carbon, High Chrome. For high production blanking, forming, drawing, trimming and shearing.

NEOR—The Original Oil Hardening, Non-Deforming High Carbon, High Chrome. Recognized as the ideal lamination die steel. Also suitable for other long run dies.

MINEOR—5% Chrome, Air Hardening, Non-Deforming. Has many desirable features of more expensive air hardening steels. Tough at high hardness.

OHT—Oil Hardening. Non-Deforming. Excellent machineability, minimum distortion, good resistance to wear. An economical steel for short run dies.

"MT6"—The Standard "M2 Type," High Speed Steel. Designed for a superior tool and at the same time save critical alloys.

And that difference often means money and time wasted. Judge Darwin tool steels solely on performance — how others have profited by its use — by thorough trial in your own plant. Darwin tool steels, used as recommended by our engineers, outperforms and is a better steel for the money than you will buy elsewhere. Call or write today, we'll be glad to help solve any tool steel problem.

Furnished in bar stock, billet, forging, and casting. Drill rod, flat ground stock, tool bits.

Bulletin on Request.

DARWIN & MILNER Inc.

highest grade tool steels

2345 ST. CLAIR AVENUE • CLEVELAND 14, OHIO
• 1410 W. FIRST AVENUE • COLUMBUS, OHIO •

REPRESENTED BY

ZEV STEEL & WIRE CO., CHICAGO • DETROIT • ST. LOUIS • INDIANAPOLIS • TOLEDO • MILWAUKEE
• W. G. OPP COMPANY, NEW YORK CITY • PECK STEEL & DIE SUPPLY COMPANY, LOS ANGELES •
CHARLES B. WEBSTER, PLAINVILLE, CONNECTICUT • CHARLES W. BRINGMAN, ORLANDO, FLORIDA

Use postpaid card. Circle No. 286

Attention!

ALL MANUFACTURERS OF VERY SMALL PRECISION PARTS

for the following industries:

AIRCRAFT INSTRUMENT & CONTROL

AUTOMATION COMMUNICATIONS

COMPUTERS & CALCULATORS

ELECTRONICS GUIDED MISSILES

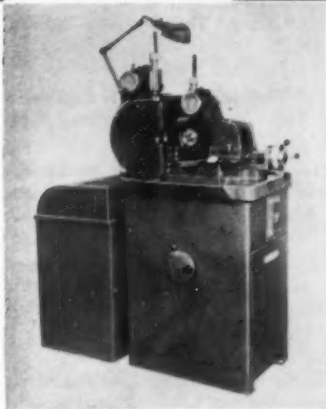
INSTRUMENTS & GAUGES

MINIATURIZING OPTICS

WATCH & CHRONOMETER

ROYAL MASTER TG-12 CENTERLESS GRINDER

*gives you Accuracy of .0002.
Speed. and Economy*



in the precision finishing of stems, shafts, gears, bearings and races, and many other miniaturized parts.

Finish-grinds diameters from .004" to 1 1/2", in pure metal, alloys, plastics, and ceramics, producing 6-8 microfinish.

Priced so low that the small shop can afford one, and the large plant will use several.

Get all the facts.

Write today for our 6 page
descriptive brochure.

No obligation.



ROYAL MASTER INC.

220 STATE HIGHWAY 23,

RIVERDALE, N.J.

Low Cost ABRASIVE FINISHER

The First Low Cost Oscillating
Spindle Sander-Grinder To
Utilize Spindles Under $\frac{3}{4}$ "

Provided with spindles $\frac{1}{4}$ ",
 $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{3}{4}$ " dia.

Sands wood, grinds metal and plastics, both internally and externally. Ideal for scroll-grill work, or small radius contours, angles. Does contours as sharp as $\frac{1}{2}$ " radius. (with special equipment down to $\frac{3}{16}$ " radius). Bevels to 45°. Table 26" x 26", tilts two ways. Handles abrasive sleeves from $\frac{1}{4}$ " to 3" dia. Drum 9" long, oscillates. Taper-shank arbors install instantly into a new taper-socket type main spindle. Drums for abrasives over $\frac{3}{4}$ " dia. may remain permanently on the new type spindles. Ball-bearing. Gears run in oil.



BOICE-CRANE COMPANY

936 W. Central Ave. • Toledo 6, Ohio

Please send free catalog on Boice-Crane
Abrasive Finisher and other Power Tools.

NAME
FIRM
STREET
CITY & STATE

MEETINGS CONVENTIONS EXHIBITIONS

Jan. 14-18—Society of Automotive Engineers, Inc. Annual Meeting, The Sheraton-Cadillac and Statler Hotels, Detroit, Mich.

Jan. 21-25—American Institute of Electrical Engineers General Winter Meeting, Hotel Statler, New York, N.Y.

Jan. 28-29—Industrial Heating Equipment Association Annual Meeting. The Shoreham, Washington, D.C. Association headquarters: Associations Bldg., Washington 6, D.C.

Jan. 28-31—National Plant Maintenance and Engineering Show, Public Auditorium, Cleveland, Ohio.

Mar. 5-7—Society of Automotive Engineers, Inc. National Passenger Car, Body and Materials Meeting, The Sheraton-Cadillac, Detroit, Mich.

Mar. 12-14—Electrical Industrial Exposition
Olympic Park Auditorium, Newark, N.J.

Mar. 17-21—American Society of Mechanical Engineers, Gas Turbine Power Division, Detroit, Mich.

Mar. 18-21—Society of the Plastics Industry Annual National Conference and Pacific Coast Plastics Exposition, Los Angeles, Calif. Locale to be announced.

Mar. 20-22—Society of Automotive Engineers, Inc. National Production Meeting and Forum, Hotel Statler, Buffalo, N.Y.

Mar. 23-28—American Society of Tool Engineers. Convention and Annual Meeting, Houston, Texas. All requests for hotel reservations should be sent directly to the hotel.

Use postpaid card. Circle No. 288

MACHINE and TOOL BLUE BOOK

Mar. 25-29—Western Metal Congress & Exposition sponsored by The American Society for Metals, Pan-Pacific Auditorium, Los Angeles, Calif. Association headquarters: 7301 Euclid Ave., Cleveland, Ohio.

Apr. 3-5—American Institute of Electrical Engineers Southern District (No. 4) Meeting, Jackson, Miss.

Apr. 8-12—American Welding Society Spring Technical, National, and Welding Show, Hotel Sheraton, Philadelphia, Pa. Society headquarters: 33 W. 39th St., New York 18, N.Y.

Apr. 30-May 1—Metal Powder Association 1957 Metal Powder Show, Drake Hotel, Chicago, Ill. Association headquarters: 130 W. 42nd St., New York 36, N.Y.

500 lb. Lifter- NOW \$210 f.o.b. Chicago

Pays for itself over and over again in time saved and by avoiding lifting injuries in moving dies, machine parts and stacking. Can be used as adjustable height work table. Rugged, simple construction, with few moving parts, has high safety overload factor. Automatic clutch holds load at any height.



Specifications: platform 24" x 24", lifting height 4' 6". Overall height 6' 0". Width 24". Foot operated floor lock.

SHOPLIFTER

This sturdy, general purpose lifter makes it easy for one man to handle lifting jobs quickly and with complete safety.

Order Today— Free Trial

specify 10 day free trial, with full credit return privilege. 1000 lb. and 2000 lb. Shoplifters also available.

ECONOMY ENGINEERING

4505 W. Lake St.
Chicago 24
Illinois

FINE CUTTING TOOLS

by *Eclipse*

Since 1913 Eclipse has been consistently and conscientiously serving many companies in widely diversified fields of production.

Each of these companies has found that "Engineered by Eclipse" is assurance of genuine quality in end cutting tools.

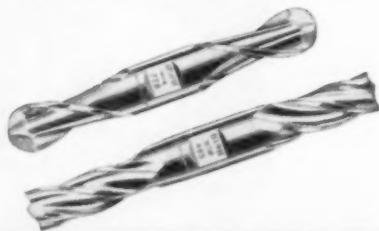


- High Speed Steel Cutters
- Carbide Tipped Cutters
- Core Drills
- Inserted Blade Cutters
- Multi-Diameters
- Back Spotfacers

and remember . . .

Eclipse now has a complete line of Precision End Mills. Ground from the solid, Eclipse End Mills insure longer tool life, finer finishes and lower production costs.

- Write for Counterbore Cat. No. 51
- Write for End Mill Cat. No. 56



ECLIPSE COUNTERBORE COMPANY

DETROIT 20, MICHIGAN

END MILL DIVISION—NORTH BRANCH, N. J.

ADDRESS
(BOX 57, RARITAN N. J.)

Use postpaid card. Circle No. 290

West Germany Today

The major article in this issue deals with a survey of West Germany's industrial rebirth. We have tried to present objective conclusions, painting a mural rather than presenting a series of etchings. Our concern was with an over all view of progress as well as pointing out signposts which would indicate West Germany's goal. It is true that the industrial development of a nation can be quickly determined by examining a variety of specific operations in detail; these will be presented in the months to come.

One of the questions we were most frequently asked upon our return concerned the Germans' feeling toward the U.S. Generally speaking, we found no anti-Americanism among the businessmen, industrialists or common people and we spent a great deal of time with all classes. All are quick to admit that without American help millions would have starved after the war and a rebirth would have been an impossibility. While the U.S. is not exactly number one on the World's Hit Parade—it being human nature to resent the neighbor who continually keeps the wolf away from the door—it was refreshing to meet a people who make no bones about their thankfulness. A review of

Marshall Plan aid to four nations, as of 1954, shows the following aid, in millions: Great Britain, \$3,641; France, \$3,104; Italy, 1,578; West Germany, \$1,473. It is interesting to note that the nation which received the least amount of aid should have resurged the most successfully.

However, comparisons of Germany with other nations is poor amusement, nothing is gained thereby, problems, temperaments, outlooks, and desires vary with nations as with individuals and all contrasts become relative. Yet, it is our opinion that in its resurgence West Germany is a challenge to existing methods and machines, to European nations for world markets and to the rest of the world in ambition and dynamic will to work. It has literally crawled out of the ruins and without engaging in expensive, profitless economic and social experimentation (which might have been expected from a shattered, broken nation) pressed forward to the sun.

Wm. J. Schleicher

**INCREASE
GEAR SHAVING
OUTPUT
with
VERSATILE
SEMI-
AUTOMATIC
LOADING**



The operator handling a conventional rotary gear shaving machine is required to make 7 separate motions for each work part shaved.

With semi-automatic loading this is reduced to just 3 operations.

- ① Place work gear on the pre-loader.
- ② Press the start button.
- ③ Remove the shaved gear.

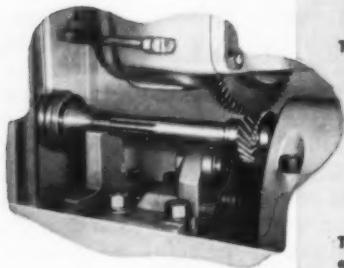
The rest of the cycle is automatic.

Results are:

- Higher production
- Lower machining costs
- Less operator fatigue
- All the versatility of conventional shaving
- Greater safety
- Operator has ample time to serve 2 or more machines

The approximate work feeder and hand and tailstock centers or plugs are the only work part changes that are additional to a conventional gear shaver.

Red Ring Shaving Machines, Models GCU and GCJ may be equipped with this equipment.



Write for Estimated Savings
on Your Particular Operation.

Plastic Splash-Guard Used for
Demonstration Only.



RED RING SHAVING MACHINES
OPERATIONS BY HARRY GARDNER
OPERATIONS BY HARRY GARDNER

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN • DETROIT 13, MICHIGAN

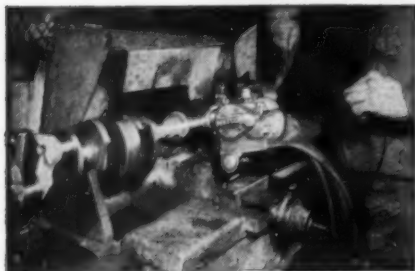
7415

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

Use postpaid card. Circle No. 291

MACHINE and TOOL BLUE BOOK

when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.



Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.



Metallizing Engineering Co., Inc.

1147 Prospect Ave., Westbury, L. I., New York • cable: METCO
In Great Britain:
METALLIZING EQUIPMENT COMPANY, LTD. - Chesham near Woking, England

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. **You haven't just salvaged a part—you've improved it.**

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

DON A. WATSON
METALLIZING ENGINEERING CO., INC.
1147 Prospect Ave., Westbury, Long Island, N. Y.

- ☐ Please send me Bulletin 57-C.
☐ Please have Metco Field Engineer call.

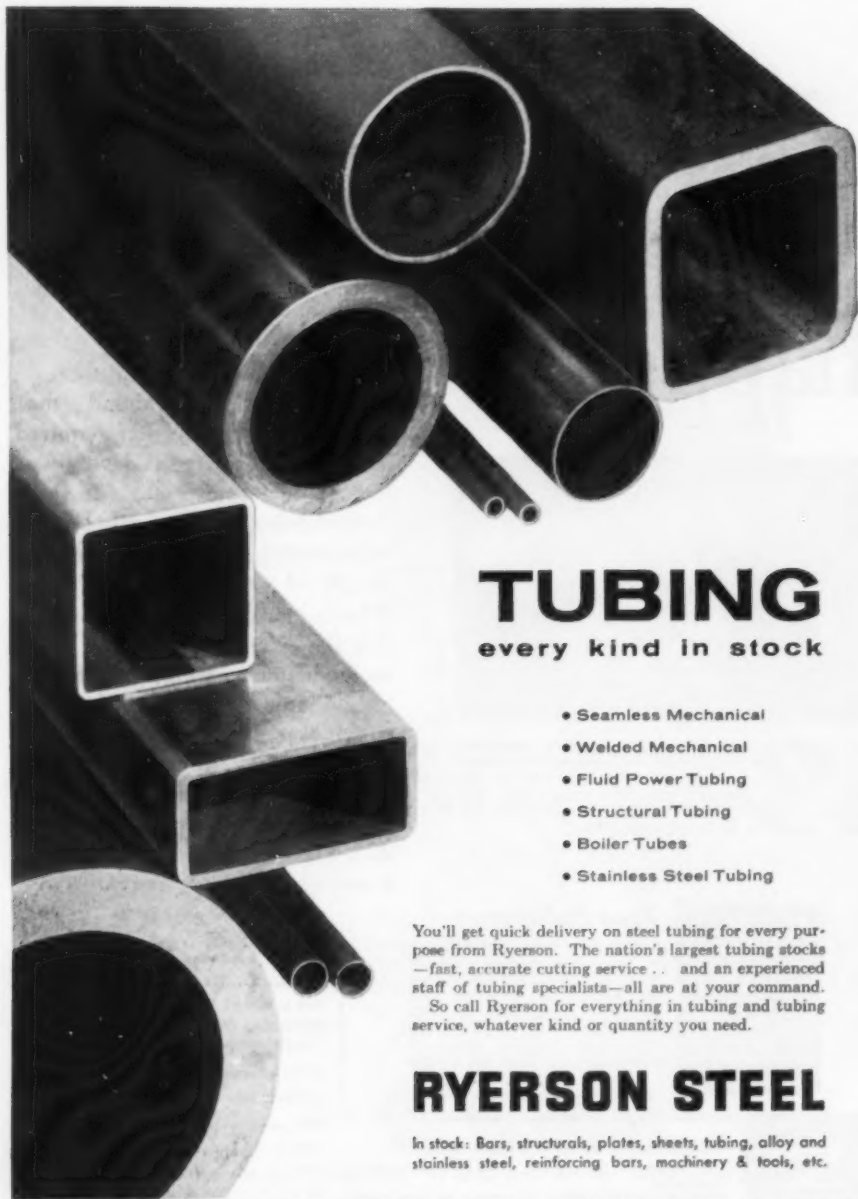
Name

Company

Street

City Zone State

Use postpaid card. Circle No. 292



TUBING

every kind in stock

- Seamless Mechanical
- Welded Mechanical
- Fluid Power Tubing
- Structural Tubing
- Boiler Tubes
- Stainless Steel Tubing

You'll get quick delivery on steel tubing for every purpose from Ryerson. The nation's largest tubing stocks—fast, accurate cutting service... and an experienced staff of tubing specialists—all are at your command.

So call Ryerson for everything in tubing and tubing service, whatever kind or quantity you need.

RYERSON STEEL

In stock: Bars, structurals, plates, sheets, tubing, alloy and stainless steel, reinforcing bars, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD • PHILADELPHIA • CHARLOTTE, N.C. • CINCINNATI
CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE


Use postpaid card. Circle No. 293



German Production Methods Today

A first hand report

By **William F. Schleicher**
Vice Pres. & Editorial Dir.
Hitchcock Publishing Co.



He was a prisoner of war until 1950 when the Russians finally released him. He returned to his home near Duesseldorf and resumed building, as best he could, machine tools.

The problems which breasted him were towering: a few machine tools rusting in a shell of rubble; material scarce and costly; capital, when obtainable, dear. He threw corrugated tin sheets over a small section of a standing bay to keep dry, placed a drum filled with waste oil and other combustible material in the middle of the floor, touched a match to it to keep warm and began to remove metal.

German Production Methods

continued

The water dripped from the roof and the smoke from the burning oil drum made an acrid, eye-watering fog in the bay. Here he started to fabricate machine tools, designed along revolutionary lines, not knowing whether anyone would buy them if he ever got them built.

Why did he return to building

machine tools? "I make machine tools because I must; when one is a machine tool builder one builds machine tools. What else can I do?"

Today he ships 27 units a month of a semi-elephant type tool. His facilities have been rebuilt, his markets recaptured and his sights are leveled at high production, ad-



AERIAL VIEW OF HAMBURG and its harbor depicts the extent of the rebuilding which has gone on since 1948 and gives an idea of the business activity taking place today.



THE VOLKSWAGEN PLANT IN WOLFSBURG on the Mittelland Canal.

ditional sales outlets, new markets.

Lest we think this unusual, consider the builder whose machines germinated in a circus tent on capital costing 8 per cent. He, too, is now in a new plant, eyeing expanded markets.

A maker of mechanical toys, staring wistfully at the debris, once a plant, seven years ago resumed making kids happy. Today his plant is twice as large as the bombed-out original.

Any discussion of current German production methods pales besides the more staggering spectacle of a people who literally crawled out of the ruins and resurged with a spirit and an iron will which merits our deepest respect. The equipment not destroyed by bombs or burned into useless twisted metal was stolen by the Russians or the victorious allies.

The German industrialists, as well as the common people with whom I spoke, were unstinting in their praise of American help after

the war. They admit a comeback, in spite of ambition, will and dynamic drive would have been impossible without Marshall Plan aid. I found no general anti-American feeling; I did find a wish and a hope that Germany and the United States would continue to work in close harmony, not only for selfish reasons but also for the deeper purpose of world peace.

Many readers may remember some of the German machine tools of the early 1950's. They wobbled around the floor like metal baskets. They don't wobble any more! German builders have increased their rigidity, added to the mass and today's machines are of solid weight for heavy, continuous production. They've multiplied the horsepower for drives, added automatic controls for the reduction of human effort and studded the machines with attachments.

Designers have eliminated many mechanical troubles which

militated against their tools five years ago.

Gone are the inferior metals, small bearings and spindles too weak for the jobs, improper facilities for dust control, lubrication or chip removal, awkward controls, complicated hydraulics and electrical circuits and failure of soft parts which should have been hardened.

For obvious reasons I have not singled out any one German builder or defined a type of tool; I intend no comparisons with American machines. The progressive American machine tool builder, however, would be well advised to sleep not and keep the drawing boards well manned.

One sees the German businessman in the breakfast rooms of the hotel at 6:30 and 7:00 in the morning polishing off the continental breakfast of rolls and coffee (which, for me, is too Spartan a fare so early in the morning—no good can come from this). Then they're away, returning late at night to resume work in their hotel room. An Italian businessman whom I met in Hannover didn't like the Germans. "They work too hard," he said.

To return for a moment to the machine tool builders: I asked one why they spent so much time on the finished appearance of the tool. Why size and rub the castings so

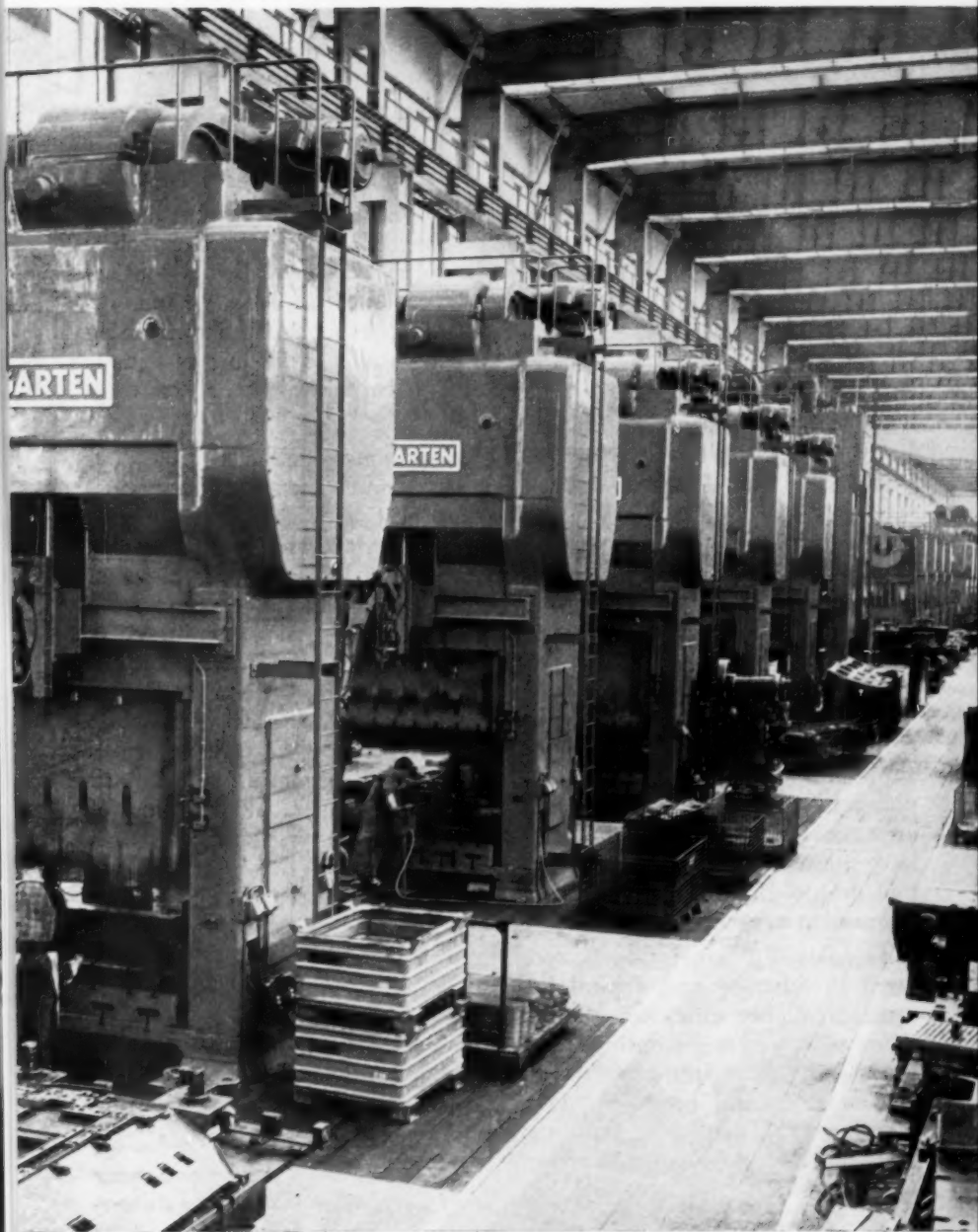
much? After all, finish is not essential to the operation of the machine, it merely adds to the cost. He said, "A machine must do a utilitarian job, of course; but you know, it must have aesthetic value as well. It must look nice. We don't like to make things that are not beautiful as well as useful."

A cynic might add, "And also enhance their sales value." For whatever reason, they are attractive.

German production methods do not vary from American practice. I saw few things we were not already doing or could do, if necessary. Much of their equipment is of old vintage, necessitating ingenious and oftentimes bizarre tooling. Generally speaking, we cannot learn from their production methods today. Here and there are fine examples of machining and tooling practices which offer the American manufacturer food for serious study, but these are in the minority.

And yet, even though the average shop was of the common-garden variety, I saw some imposing installations which compared splendidly with some of our best.

And if we hold up our American automobile shops as imprints of advanced manufacturing technique I would urge a visit to Opel in Rus-



GENERAL VIEW OF STAMPING LINE at Volkswagen-Hannover works where delivery trucks are also stamped.

German Production Methods

continued

selsheim, or the Volkswagen works in Hannover.*

The Volkswagen Hannover works, where the stamping and assembly lines of the Volkswagen trucks are located, is a delight. Airy, light, wide aisles, everything conveyORIZED from stock feeding through the presses to final delivery of the bodies to the lines, the plant is beautiful in layout and pleasing to anyone interested in efficient production.

At General Motor's Opel Works in Russelsheim the emphasis is on automation. Gunard Winstrom and his associates, working closely with German as well as American machine tool builders, have developed automatic lines which closely parallel Detroit; in a few lines they are superior. Opel requirements have influenced German machine tool design just as Detroit has influenced American design.*

As sales of their products continue to advance and capital becomes available, efficiency of their shops will increase. Continual improvements in facilities and products is a natural concomitant to their desire for more sales. And it is just this driving desire to improve,

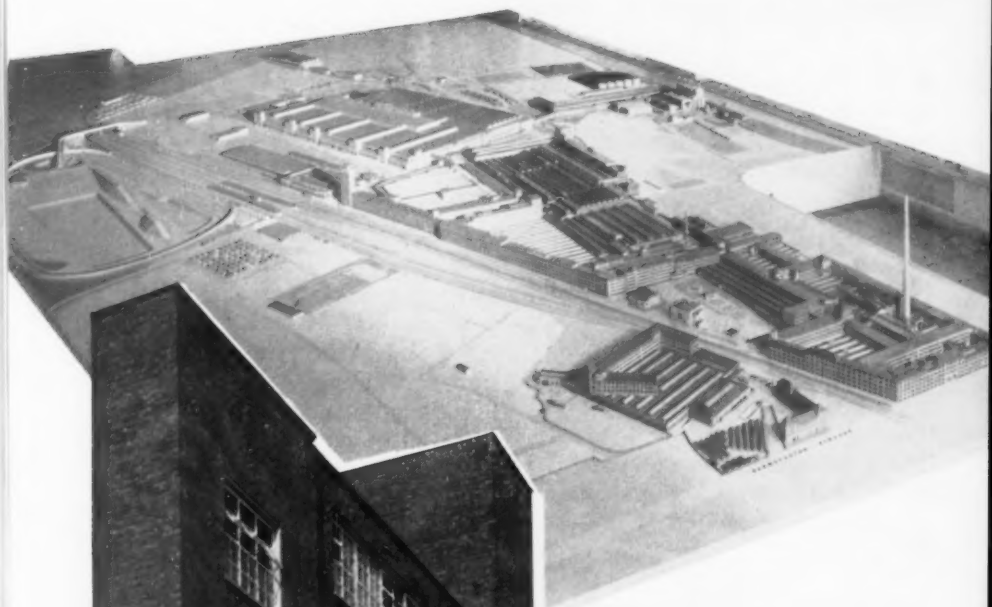
to advance, which constitutes a challenge. Their forward march is in step with ours; their political and economic outlook is American in many respects and is refreshing among some of the major nations of Europe, tottering from one crisis into another.

Enormous problems still doggedly beard the German nation. The past dies slowly; memories rankle tenaciously; forgiveness, faith, respect—rare qualities, at best, in the human race—are no more easily earned than they are given. Among the material problems are: fantastic war costs and their clinging shadows gobble up huge chunks of capital; the need for recapturing world markets; lack of engineering talent; high cost of modernizing equipment, most of it being obsolete; the excessively high cost of many manufactured articles (washing machines, autos, refrigerators, etc.) which militate against mass sales and thus against mass production; and, of course, the division of the nation into east and west, an explosive powder keg over which communism hovers like an evil brooding bird of prey.

One area of German endeavor is of particular interest to America: manpower.

Apprenticeship training pro-

*Future issues of the BLUE BOOK will carry individual technical articles on both the Volkswagen plants and the Opel Works. This material is now in preparation and it is expected that they will be published the early part of 1957.



ABOVE: Model shows total view of entire Opel plant from the south side.

LEFT: New automotive plant at Adam Opel AG, Russelsheim. Towers divide the 425 meter long south wall into five equal sections. Working area is 797,364 meters. Here is one gigantic layout combining 34 press lines of the sheet metal shop, body manufacturing division and final assembly.



German Production Methods

grams flourish in the metalworking industry. Machine tool builders, as well as automobile, and general manufacturers, are training skilled help in large numbers. One manufacturer uses his apprentices to combat the engineering shortage (as serious in Germany as in the U.S.). After conclusion of their apprenticeship periods the more serious and intelligent of the boys are given additional schooling and training as engineering assistants, thus freeing engineers for creative work. Routine tests, reports, simple calculations, drawings, etc., are delegated to the engineering assistants.

One curious, yet pleasant surprise awaits the American visitor to German plants: the absence of shop paper work and shop clerical help.

In all of Volkswagen (Hannover and Wolfsburg Works) no one runs around with reports and cards. Shop desks with their inevitable conference of three or four workers making loud noises shuffling papers do not exist. Stock control is simple: so much in, so much out.


The desperate need of European nations, including Germany, for free international trade becomes apparent immediately through first-hand observations. Stimulating such trade is not so much a desired sales goal, a graph on a profit sheet, as it is basically essential to exist-

continued

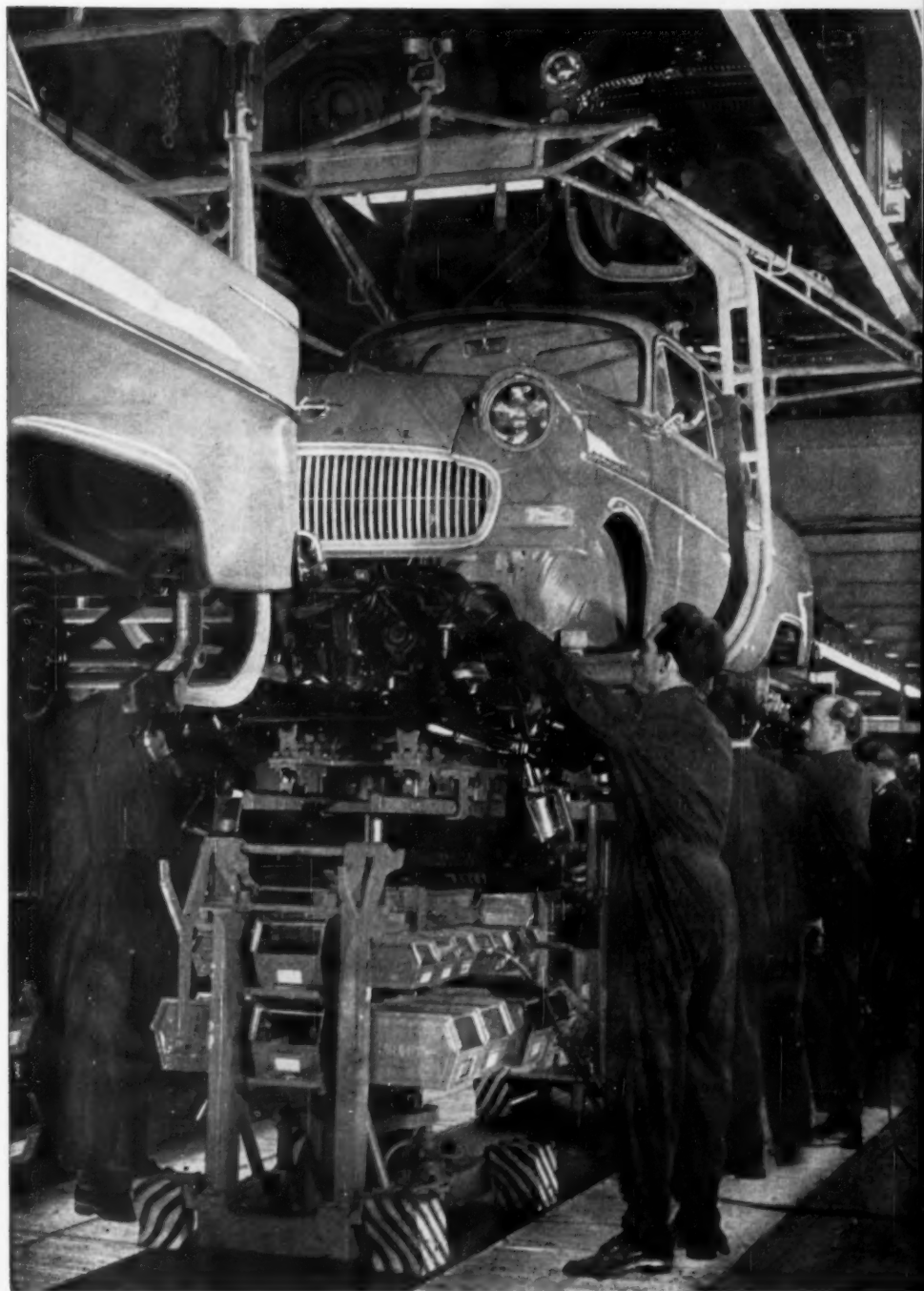
ence. The Germans intend to assure this basic existence, hence their turbulent efforts; the opposite to this effort is foreign aid.

At no time did I encounter the German businessman associated with pre-war Germany: arrogant, haughty, domineering. Today's businessman, 24 years older and 100 years wiser gives the impression of wanting to conform to international standards and patterns.

While German efficiency, often so laughable in its fantastic extreme, is unimpaired there appears to be pressure to change that type of so-called efficiency which results from layer upon layer of bureaucratic regulations and rules. The German must order everything so thoroughly that no possibility of error exists, so that every eventuality whether motivated by foolishness, stupidity or dishonesty, is covered by a regulation. No possibility of missteps exist; conversely, no independent thought or individ-



MERGING OF TWO CONVEYORS in the Adam Opel new final assembly plant: Emerging from a chute in the upper floor, the body supply conveyor lowers the body onto the chassis conveyor which, in timed relation with the body conveyor, brings the engine, front and rear axle to the final assembly point on special assembly fixtures. At the very moment of the exact mating of body and chassis mounting bolts shoot through holes machined to correct fit while power drivers tighten nuts in seconds of time.





FINAL ASSEMBLY LINE at Volkswagen works plant in Wolfsburg on the Mittel-land Canal.

BODY PRESSES with automatic transfer of stampings at Wolfsburg plant.



ual act is encouraged or tolerated. This is disastrous to ambitious, intelligent workers whose initiative is too often stifled by precedent. But bureaucratic changes occur slowly, and it can well be imagined that an immediate abrogation of rules and regulations would result in lusty confusion.

When this zeal for craftsmanship is coupled to a dynamic will to

succeed and to a herculean capacity for labor, combined with an ambition to regain stature and respect in the world—and when this is all predicated upon dire necessity to succeed for bare existence's sake, it becomes apparent that here is an economic challenger, if not for world economic supremacy, to European economic supremacy.

• • •



A portable, height adjustable, steel table-truck-work bench! Used for die transfer, machine feeding, assembly (at best height, in best light). For lifting, lowering, transport of all compact, heavy loads. Saves "handling" accidents to both men and materials. Saves minutes for men wherever used.

Write*
for NEW, FREE Bulletin
No. P-2408



IT'S A
Hamilton Tool
USE IT WITH CONFIDENCE

2408



ADDRESS

Recent changes and additions provide many bonus features.

Unobstructed perimeter
(work from any side!)

Six
Wheel
Models



Capacities to 5,000 pounds.

PORTELVATOR
The Handy HAMILTON Portable, Elevating Table

3 table surfaces
4 point support

Four
Wheel
Models



Special
Designs
tool

More Service
for Less Money than
Any other unit of equipment

THE HAMILTON TOOL COMPANY
826 South Ninth Street
HAMILTON, OHIO

by James Joseph

Here's the lowdown on Kaiser Steel's dollar-wise preventive obsolescence program that reduces spares inventory yet all but eliminates outages

Have a Parts Obsolescence Problem?

THE BIG QUESTION: is this part headed toward obsolescence?



● In 1955, Kaiser Steel Corp. reduced its maintenance spares inventory by \$1,000,000—yet at the same time all but eliminated outages in any parts category.

Scaled to the average plant, the above figures are comparable to a \$5000 parts stock slashed by \$600—with the apparent contradiction that more parts are available than ever before.

Behind this seeming contradiction is Kaiser Steel's year-old "Preventive Obsolescence" program, which redefines "obsolescence" from a mere numerical accounting to a dollars-cents evaluation.

Preventive Obsolescence, as



Precision TAPPING OF THIN AND BRITTLE MATERIALS

Recent design change provides a simple homing device as a standard component of the

HAMILTON SUPER SENSITIVE, SMALL-HOLE PRECISION TAPPING MACHINE

and makes routine of such problem work as the tapping of precision holes in thin metal sheets or in brittle plastics. Even improves performance in the tapping of blind holes!

YOU

will want full information about this important development!

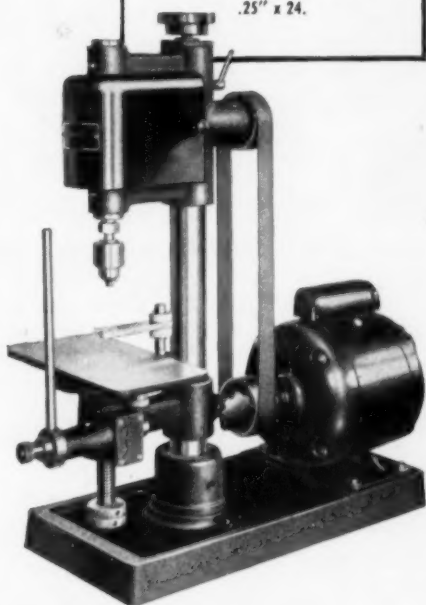
WE WILL FURNISH IT

FREE

ask for
BULLETIN No. 2463

ADDRESS

THE HAMILTON TOOL COMPANY
826 South Ninth Street
HAMILTON, OHIO



Hamilton Super Sensitive, Small-Hole,
Precision Tapping Machine.

Capacity — .034" x 120 to
.25" x 24.



IT'S A

Hamilton Tool

USE IT WITH CONFIDENCE

Use postpaid card. Circle No. 295



70,000 ACTIVE ACCOUNTS have been set up by Kaiser, and each is tied to a specific catalog number.

practiced at Kaiser, has three aims: (1) to discover obsolescence in current spares; (2) to anticipate and forestall obsolescence; (3) to rework obsolete parts; make them useable.

It's a program tailored to metalworkers everywhere, regardless of a company's size.

The program begins with a thesis; that surplus or obsolescence can only be realistically appraised in terms of dollars and cents.

Secondly, Kaiser considers its big maintenance spares warehouse a "bank." It's a bank capitalized at \$8,000,000 by some 70,000 different items. And like a bank, each item has its own ledger-account.

Weekly, through machine-accounting, each ledger is balanced, the account's activity (additions or withdrawals) tabulated.

The banking principle established, the program moves into the shop. For basically, parts obsolescence is tied to machinery.

What makes a part obsolete? Most shopmen consider a part obsolete when it no longer fits existing machinery. That's the numerical evaluation. It's valid as far as it goes, but Kaiser considers it costly when applied without limitations to the average metal-working plant.

More important is *dollar obsolescence*. Let's take some examples: (1) a part may be dollar obsolete

NOW

CUT COST OF PRECISION GEAR PRODUCTION

5490

THIS FEATURE: "Independent selection of speed, feed and indexing," sets the Hamilton Precision Small Gear Hobber apart from the field,

AND ENABLES the users of this machine to vary speed and feed to suit the material being machined.

THIS FACT, and a "reserve of accuracy" built into the machine, work spindle and hob spindle runout of less than .0002" as an example,

CONTRIBUTES to more gear precision with no sacrifice of gear production,

OR INCREASED gear production with no sacrifice of gear precision,
..... OR BOTH!

Prices and specifications without obligation

ASK FOR FREE BULLETIN 5410

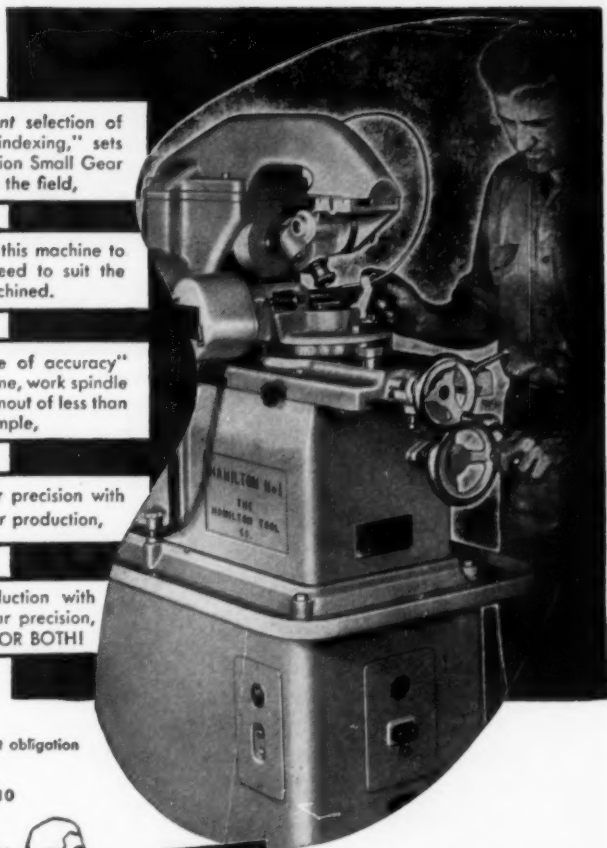
Address

The Hamilton Tool Company
826 South Ninth Street
Hamilton, Ohio



IT'S A

Hamilton Tool
USE IT WITH CONFIDENCE





*When
Mistakes
Happen . . .*

*— and they do in every shop —
you'll find that the ideal tools for
removing excess welds . . . blending
in castings or molds . . . removing tool
marks . . . or putting keyways into
hardened metal parts . . . are —*

KELLERFLEX®
CARBIDE BURS . . .

AVAILABLE FROM STOCK IN A COMPLETE RANGE OF
SIZES AND SHAPES AT THE P&W BRANCH OFFICE NEAR YOU.

Use postpaid card. Circle No. 297

Preventive Obsolescence

continued

if, thru overbuying, the warehouse finds itself with a part which cost \$1 last year, but now is priced at 75c; (2) A part may be useable, yet obsolete dollar-wise, because some new development has made another easier to install, longer lived, less costly in labor maintenance; (3) A part may be surplus because it costs too much (in the quantities stocked) to purchase and carry in inventory; (4) And, of course, a part may be headed toward obsolescence because of some change in machinery or process.

By this concept, it's safe to say that many parts stocked in your warehouse or stockroom, while perhaps not numerically obsolete (they're still useable) are nonetheless dollar obsolete. The cost of retaining them—the money invested in the original purchase—is, in any case, wholly or partially lost.

This thinking cautions Kaiser against buying for a price break (except in certain very low-value per unit items). Instead, Kaiser is convinced that for every spare there is a definite economic number

of times to order every year and a definite economical number of the item to carry in stock. The formula, machine-tabulated, considers every facet of a spare's end-use, particularly its use-history as it concerns the plant and the specific machinery for which the spare's intended.

That's the purchasing phase of preventive obsolescence—one method for anticipating and forestalling future obsolescence.

What about rooting out obsolescence that's current, that lurks in almost every shop's stock room?

Kaiser has set up 70,000 active accounts, each tied to a specific catalog number.

Use-history shows that of these 70,000 items, 8-10% represent fully 70% of the bank's total investment. That is, 6000-7000 items (and their accounts) represent an investment of about \$5,600,000. These "select items" are watched carefully and segregated. For obsolescence occurring in any one of them can involve a high dollar loss. Select items are usually valued at \$50 or more per unit, and Kaiser has some units tagged at \$15,000.

Obsolescence is likewise predicted long before it becomes actuality. The dollar obsolescence concept gives special attention to slow-moving items—to warehoused spares which, thru their use-history, seem likely to become obsolete.

teamed with a **KELLERFLEX**[®] **FLEXIBLE SHAFT MACHINE**

Finest, most dependable machines for burring, filing, sanding, grinding, polishing, wire brushing . . . and many other jobs. Easy to use . . . operator holds only the light handpiece . . . powerful motor is supported by stand. Versatile "Series M" Machines provide 16 speed changes .

Available with 1/2 to 1 hp. motors.
Convertible stand provides floor stand, bench or suspension mounting.

Write for complete information on **KELLERFLEX** Burs or Machines. Pratt & Whitney Company, Incorporated, 22 Charter Oak Boulevard, West Hartford, Connecticut



PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY
MACHINE TOOLS • GAGES • CUTTING TOOLS

Use postpaid card. Circle No. 298



OBsolescence IS CHECKED further in shelf-to-shelf warehouse surveys.

Slow-moving items are segregated, and discovered, by machine sorting. Every week, as the 70,000 account punch-cards are processed, the machines cull the slow-moving accounts.

Kaiser has set up three classifications of slow-moving parts. Initial pigeon-holing of an item in Class I, the first slow-moving category, comes when the spare has not been issued for more than six months and when there have been no receivings (additions to stock) for more than three years. Any item falls into Class II if there's been no issue for six months, no receivings for 4 to 5 years. Items are classified Class III if they haven't

been issued in six months nor had receivings for more than five years.

The first indication of an item headed toward obsolescence is lack of issuance—low activity in its "account."

Each slow-moving classification involves a percentage of "write-down"—devaluation of the items from their former full value to a new lower book-value. While essentially a tax function, the write-down has a secondary purpose—it realistically appraises maintenance of a potential dollar loss. Most important the loss must be debited against the warehouse's total capitalization. Every write-down for obsolescence reduces total capitalization. The loss is reflected not only as a dollar loss to the company—but physically, as fewer parts for maintenance. Accounts are successively "written-down" thru Classes I to III, until spares are carried at 9.9 per cent of their original cost.

How does all this tie into specific machines, and more particularly, into plant maintenance, the people the warehouse serves, the people who originate the purchase orders which one way or another, lead to actual or projected obsolescence?

It was discovered that the big need was for closer coordination between stockroom, engineering and maintenance. An engineering change may, for example, throw many categories of spares (and thus many ledger-accounts) into obsolescence. That's why the Store

Superintendent sits in on the plant's weekly maintenance meeting. He learns first-hand, and sometimes years ahead of actual conversion, of a pending change. It may be a small redesign. It might be a major change, the replacement of machinery, or the purchase or exchange of new models. From what he learns, he can evaluate these changes as they threaten to obsolete his spares.

Secondly, there's the matter of maintenance—or any other segment of the plant—ordering purchased parts. The average maintainer wants to assure himself a continual supply of a part—which is natural. Yet, it's safe to say that often he overorders.

Thus, Kaiser adopted a query, called the "Request for Purchase" form, abbreviated RFP.

When a maintenance man requests a parts purchase, he must answer some questions. All are gauged toward detecting possible obsolescence, both present and future. And not only of the part he's requesting, but possibly some part the company already has in stock which, thru his order, could become obsolete.

Some searching questions asked by the RFP form: "Why is the item being ordered?" "What is the approximate life of ordered material?" "Is part used anywhere else in the plant?" "Does item replace material now in stock? If so, what material?" "If answer is yes, what dis-



KAISER'S BIG MAINTENANCE warehouse is a "bank," capitalized with some \$8,000,000 and 70,000 different items.

position should be made of present stock?"

Let's analyze these questions as they pertain to your own stock room—and to Kaiser's.

First, "Why is item being ordered?" Kaiser warehousemen aren't looking for the obvious, "because machine No. 345 needs a new bearing." They're looking for clues. What's the matter with that particular bearing? Isn't it holding up as it should? If not, reordering might only aggravate and project obsolescence into the future. For, if the bearing needs too frequent replacement, it is, from a labor cost viewpoint, already *dollar obsolete*. Perhaps it's a problem for Materials

Preventive Obsolescence

continued

involved has a life-expectancy of only five more years. Or maybe, unknown to the maintenance man, engineering contemplates a machine change-over.

A handful of pointed questions, directed to the men who actually use, install and engineer Kaiser's equipment, have forestalled a serious investment, a drain on the stockroom's capitalization.

With the "Request for Purchase" form in hand, warehouse clerks compile a minutely detailed description of the requested spare. The description is punched into a tab card. And the search begins. Even in the 5000-item stockroom, it's difficult keeping track of all parts. Duplication is common and costly, and leads to obsolescence. So at Kaiser, every one of the 70,000 account cards are sorted, searching for warehoused parts which duplicate or closely resemble the part requested.

Kaiser Steel has discovered thousands of duplications in this way. And the same sleuthing can be done without machine accounting, simply by detailed, sufficiently indexed parts cataloging.

But more than the "Request for Purchase" form is involved.

Equally essential in forestalling obsolescence is Kaiser's "Request for Material Information" form—abbreviated RMI.

The RMI is primarily directed to engineering, although it serves Research, calling for their analyzing of the part. Or perhaps Engineering should re-evaluate the item's use or specify a better bearing. If need be, Materials Research may contact the manufacturer to suggest design changes. Kaiser, for example, would gladly pay \$1 for a bearing that lasted six months rather than stock 50c bearings good for only a month's use.

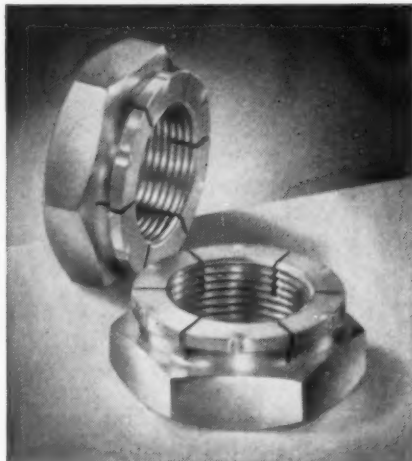
For in both theory and practice, spares may become dollar obsolete if the part involves, habitually, too much maintenance labor.

So, if the maintenance man's answer to that first RFP question suggests future obsolescence, the warehouse wants to know about it.

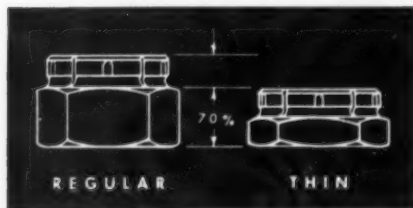
Take another question on the RFP form, "What is approximate life of ordered material?"

While this may seem to overlap the first question, actually it's pointed in another direction, aimed at anticipating dollar obsolescence. Suppose the maintainer says the part should last a year and he orders 10 parts. But engineering, queried regarding the part (on another form which I'll take up shortly) indicates that the machine

Flexloc thin nuts save space, weight and production time



Standard FLEXLOC self-locking thin nuts are available in plain or cadmium plated alloy steel, for use in temperatures to 550°F; in plain or silver plated corrosion resisting steel, for temperatures to 750°F; and in brass and aluminum, for temperatures to 250°F. Standard sizes range from 6-32 to 1-8 NC-USS, from 6-40 to 1½-12 NF-SAE.



FLEXLOC thin nuts are 30% lower than regular height locknuts. There is a corresponding saving in weight. In sizes through ¾ in., thin FLEXLOCs meet tensile strength requirements for regular height locknuts. FLEXLOC nuts can be made in the thin type because every thread, even those in the locking section, carries its full share of the load. There are no nonmetallic inserts to waste head space or weaken the structure of the nut.

Self-locking nuts are 30% lower and lighter; speed up assembly with hand or power tools

Self-locking FLEXLOC thin nuts are 30% lower than regular height locknuts of the same nominal diameter. They fit into spaces where regular height locknuts will not go. You can design lighter, more compact units with them.

Where you must reduce weight in a completed assembly, you can save by using shorter bolts with these lighter nuts. And you save production time. The length of engagement of mating threads is shorter: fewer revolutions of hand wrenches or power nut runners are needed to seat them.

FLEXLOC nuts are of 1-piece, all-metal construction. You can use a FLEXLOC fully seated as a locknut or at any point along a bolt as a stop nut. Once the threads in the resilient locking section are fully engaged, the FLEXLOC grips the mating threads with uniform locking torque wherever wrenching stops. Since there are no nonmetallic inserts to come out or deteriorate, the locking life of a FLEXLOC is virtually unlimited.

Your authorized industrial distributor stocks FLEXLOC nuts in a variety of sizes, materials and finishes. Consult him for details. Or write us for information about your special locknut problem. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 52, Pa.

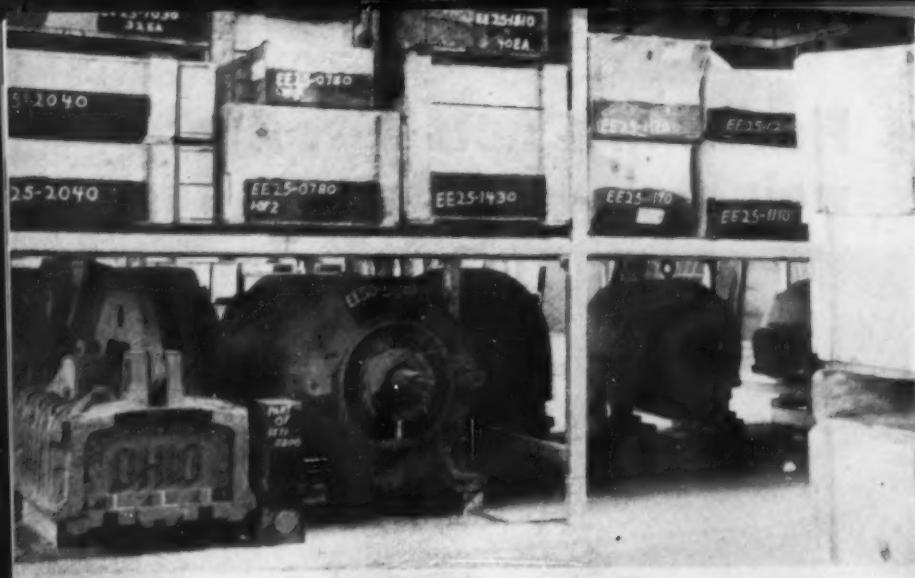
FLEXLOC LOCKNUT DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

Use postpaid card. Circle No. 299



SELECT ITEMS are usually valued at \$50 or more per unit.

Preventive Obsolescence

continued

several purposes. It's a double check against the RFP form. It helps gather data about slow-moving items. It's valuable in predicting obsolescence involving any item, big or small, costly or inexpensive.

Often the RMI, which routes from stockroom to engineering, is accompanied by a blueprint of the part under scrutiny.

The RMI asks engineering some equally searching questions: "Is the above description and attached blueprint of the item correct?" Here, Kaiser is double-checking specs to make certain obsolescence doesn't occur thru ordering a faulty or incorrect part. Another question: "Are any engineering

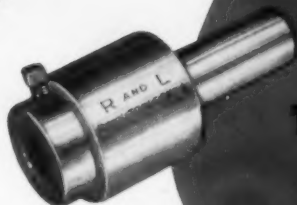
changes pending?" The answer helps to predict future obsolescence and helps in compiling the part's purchasing formula.

For the first eight months of 1954, considerably less than two per cent of Kaiser's spares inventory was verging on obsolescence.

A small percentage, but Kaiser considers even this figure high. It is explainable because the company was in the process of installing a 46" blooming mill to replace its 36" mill. A blooming mill involves thousands of spares, and this sudden obsolescence, in the first year of the program, distorts the figures. There's no reason why, with every segment of the Preventive Obsolescence program functioning, the annual figure shouldn't sink to a fraction of 1%. • • •

Cut

COSTS
COSTS



with R and L
TAP AND DIE HOLDERS



*New Release Mechanism
allows for easy adjustment
for right or left hand
tapping and threading.*



Ready to start threading operation, clutch slightly engaged at C.



Instantly engaged to full contact between A and C as soon as tap or die engages work.



Fully released allowing ample clearance between contact points of clutch.

Instant engagement
at full contact . . . Fast
kick out clutch . . . No spring
plungers to wear or break . . .
No small screws to work loose!
Available with shanks of from $\frac{3}{8}$ " to $1\frac{1}{2}$ "
in releasing and non-releasing types as well as
releasing die holders for acorn dies.

*Send for new
catalog*

R and L TOOLS

1825 Bristol Street, Philadelphia 40, Pa.

- ☐ Send new catalog
☐ Please have representative call.

NAME _____

COMPANY _____

ADDRESS _____


R and L TOOLS

1825 BRISTOL STREET • PHILADELPHIA 40, PA.

TURNING TOOL • CHAMFER OR ROLLER RACKS • RELEASING OR NON-
RELEASING TAP AND DIE HOLDERS • RELEASING DIE HOLDER FOR ACORN DIES •
UNIVERSAL TOOL POST • CUT-OFF BLADE HOLDERS • RECESSING TOOL •
RELEASING DIE HOLDERS • TAPPING DIE HOLDERS • RECESSING TOOL

Use postpaid card. Circle No. 300

BB-1-57



5½" Long Holes Drilled at 120 Pcs. per Hour Rate

Drill on automated boring machine is fed at rate of 15 ipm to produce 7/16" diameter hole in cast iron valve guide bushings.

SPECIAL TO: MACHINE AND TOOL BLUE BOOK

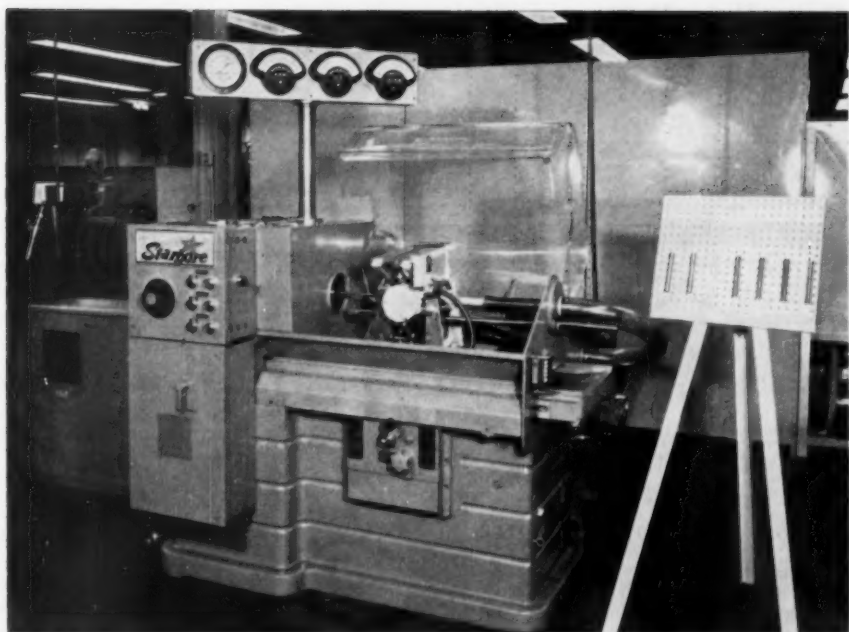
● Precision holes, 5½-in. long, are produced in valve guide bushings at a rate of 120 pieces per hour with a Starbore drill on a standard No. 112-C Excello precision boring machine. This machine is equipped with an automatic loader and pressurized coolant system by Star Cutter Company, Farmington, Michigan, and was displayed at a recent International Harvester Company Open House program. (See "Progress Through Automa-

tion" Nov., 1956, page 117)

Blue print specifications for the 7/16-in. dia. hole in the cast iron valve body call for a 0.001-in. hole size tolerance and 0.002-in. concentricity of the hole with the ¾-in. OD of the centerless-ground part.

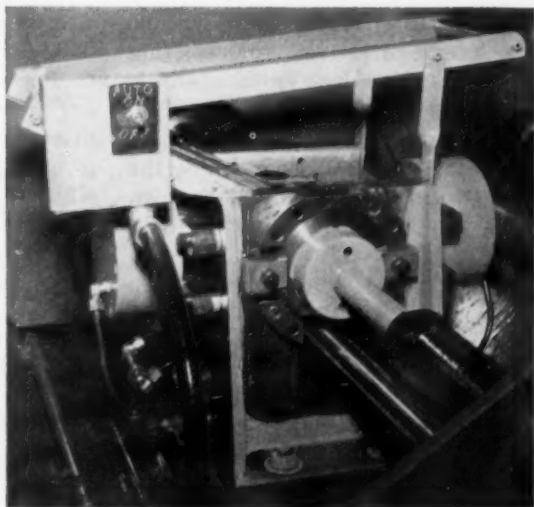
The holes are consistently produced by the new drill in this setup to a 0.0005-in. size tolerance and 0.001-in. concentricity with the outside diameter.

The Starbore drill, which is guided by a hardened steel bush-



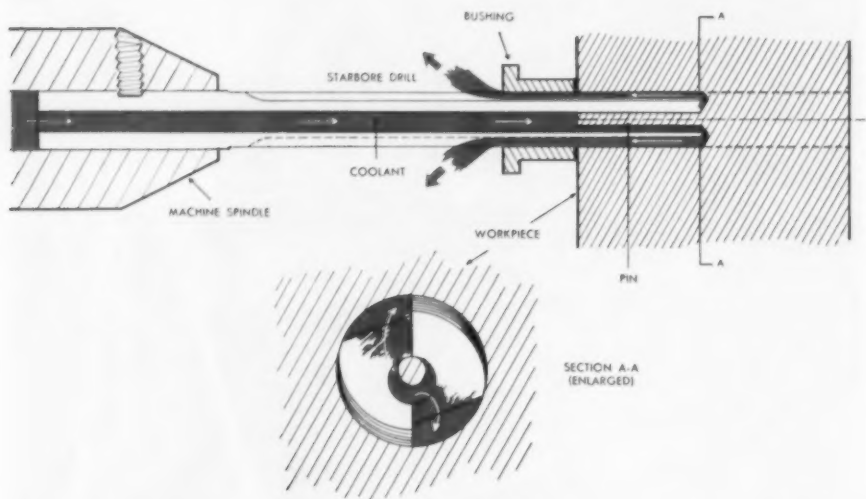
HOW STARBORE DRILL is mounted on Exello precision boring machine. This was exhibited at International Harvester Co. Technical Conference.

CLOSE-UP VIEW of the Starbore drill that makes holes with a 0.001-in. hole size tolerance and with finish in the 30 to 40 micro-inch range.



Deep Hole Drilling

continued



GUIDED BY HARDENED STEEL BUSHING, drill has off-center through hole the length of tool for directing pressurized coolant to carbide cutting edges.

ing, has an off-center through hole the length of the tool for directing pressurized coolant to the carbide cutting edges, as well as providing a trepanning action. A 5½-in. long, 0.083-in. dia. pin is produced by the tool during the drilling process. This pin is ejected from the drill when the hole has been completed and is directed into the chip area by a bent steel tube.

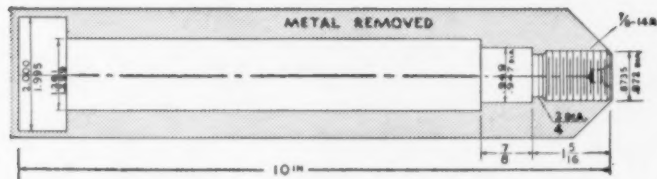
The drill is fed at a rate of approximately 15-inches per minute and produces holes in the 30 to 40 microinch, rms surface finish range.

A sulphur-base coolant, Vantrol 5468-G, is directed through the tool at a pressure of 350 psi. Coolant pressure is provided by an auxiliary pumping system. All coolant is passed through a Barnesdrill Kleenall magnetic separator unit equipped with a fabric filter.

The automatic loader is a magazine type that includes a chucking fixture which is mounted on the table of the boring machine. V-type jaws operated by two air cylinders hold the part for the drilling operation. Finish-drilled parts are automatically ejected from the fixture.

• • •

HERE'S REAL BREAD-AND-BUTTER PRODUCTION!



Warner & Swasey 1-A combines power and instantaneous speed changes with standard tooling for top efficiency on this small lot job.

The practical shop man knows that, after all the smoke has cleared about fancy attachments and special tools, most small lot work depends on his real "bread and butter" producer—the versatile, standard-tooled turret lathe.

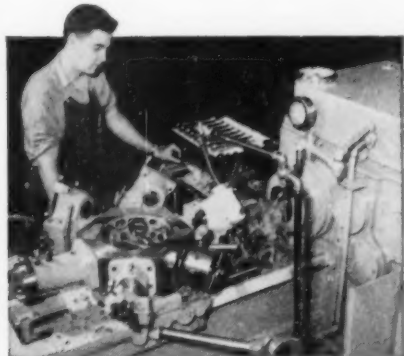
And here's a typical small lot bar job, a 10-inch pinion shaft, that demonstrates this point. It requires the flexibility of standard tooling, power to really hog metal, and a fast selection of the most efficient cutting speeds. A new Warner & Swasey 1-A Extra Heavy Duty Turret Lathe, equipped with standard tools,

does the job in 4½ minutes—*real metal turning efficiency!*

It requires a variety of cuts with 7 speed changes. The 1-A's 16-speed, all-clutch head, with its pre-selector, delivers them instantaneously!

First cut in this high carbon steel shaft is taken with a standard single cutter turner, using a carbide cutter. It is 1/2-inch deep and consumes 30 horsepower! Second and third turning cuts are also taken with single cutter turners, using cutters with mechanically-held, throw-away carbide tips.

Traditional Warner & Swasey ease of machine handling, enhanced by the new hydraulically-operated collet chuck and bar feed, not only cuts cycle time but cuts operator fatigue—puts more pieces on the floor at the end of each day!



WARNER
&
SWASEY

Cleveland

PRECISION
MACHINERY
SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS... WITH A WARNER & SWASEY



Pictured above is Johnson's J-Cool—a superior coolant for all-purpose use—one of the complete line of modern coolants.

For 50 years nothing important happens to coolants... now a major improvement!

Johnson's discovery—the use of waxes and wax-type synthetics in specially formulated metalworking fluids—is the first major improvement in coolants since 1900.

Use Johnson's for high-speed machining, grinding and forming. Results will convince you of their superior performance. You'll get increased production from your men and machines... the quality of

work will show a definite improvement. In other words, Johnson's can help you reduce costs and increase profits on your production lines.

Your Johnson's industrial distributor will be glad to set up an in-your-shop test of J-Cool... or any of the complete line of Johnson's Metalworking Fluids. Ask about Johnson's money-back *Guarantee of Superior Performance* over ordinary coolants.

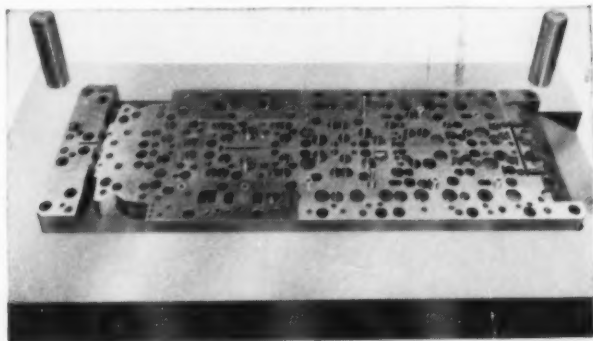
from
Johnson's
Wax



S. C. Johnson & Son, Inc., Industrial Products Dept., Racine, Wisconsin

Holes **JIG GROUND** with *Vulcanaire*

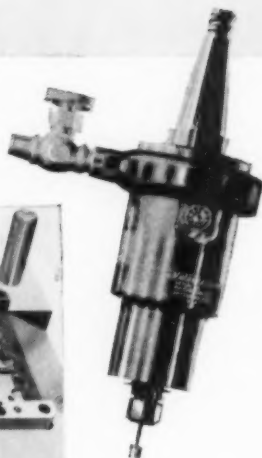
Provide yourself with this inexpensive* instrument for use on your present equipment and JIG GRIND with a guarantee.



A seven station die from Vulcan's contract Tool Room
(Your Tool Room in Dayton).

Standard sized punches and buttons were used. But since forming and piercing operations were involved, hardening of the sections was necessary followed by JIG GRINDING. Result: Close tolerances held easily and perfect progression throughout — another satisfied customer.

*Vulcanaire equipment pays for itself on the first job.



Vulcan's
45th year.

Borrow
Vulcan's
instructive
movie on
jig grinding.

Services of **YOUR TOOL ROOM** in Dayton

Engineering, Processing, Designing . . . Special Tools . . . Dies . . .
Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . .
including the Vulcan Hydraulics that Form, Pierce, Assemble and Size . . .
Vulcanaire Grinding Heads . . . Motorized Rotary Tables . . . Plastic Tooling . . . Vulcanaire Jig Grinders.

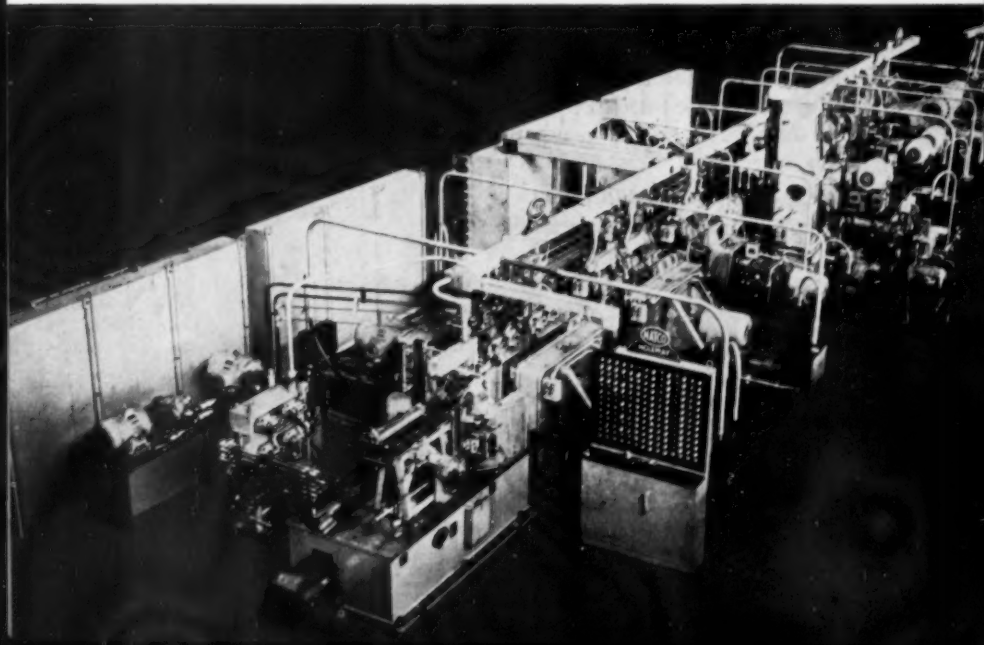
VULCAN TOOL CO. 710 HIGHLAND AVE. **DAYTON 10, OHIO**

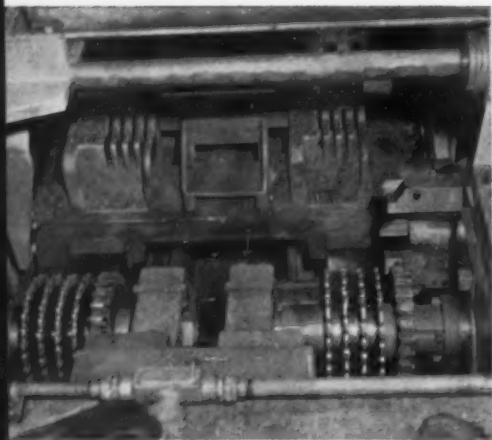
Processing Two Sets of Bearing Caps at Once

One-third machine cost per part results with installation of bearing cap transfer machine

• Several new concepts have been introduced in the bearing cap transfer machine, shipped in mid-October by National Automatic Tool Co., Inc. to a large automobile producer. It is the first

27-station Natco automatically loads 2 bearing cap castings, performs 80 operations on 240 complete sets per hour and automatically feeds assembly conveyor.





Two bearing cap castings are fed into two 40 HP saws, cut into two complete sets of 5 caps each. All surfaces are parallel within .0015".

News of Automation

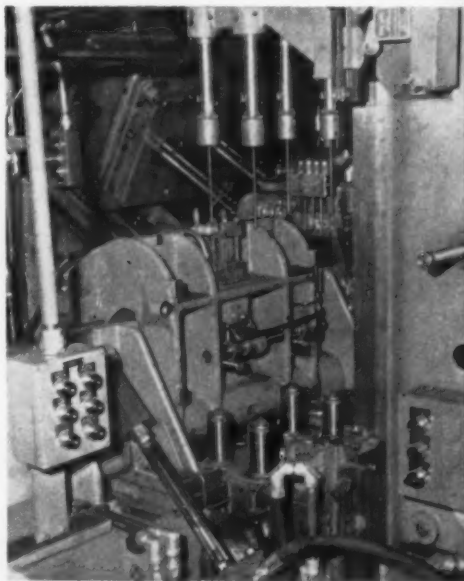
continued

transfer machine capable of processing two complete sets of caps simultaneously. Now producing 240 sets of bearing caps per hour, the new Natco is almost six times as productive as the machine it replaces, allowing the user to process parts at one-third of the previous machine cost.

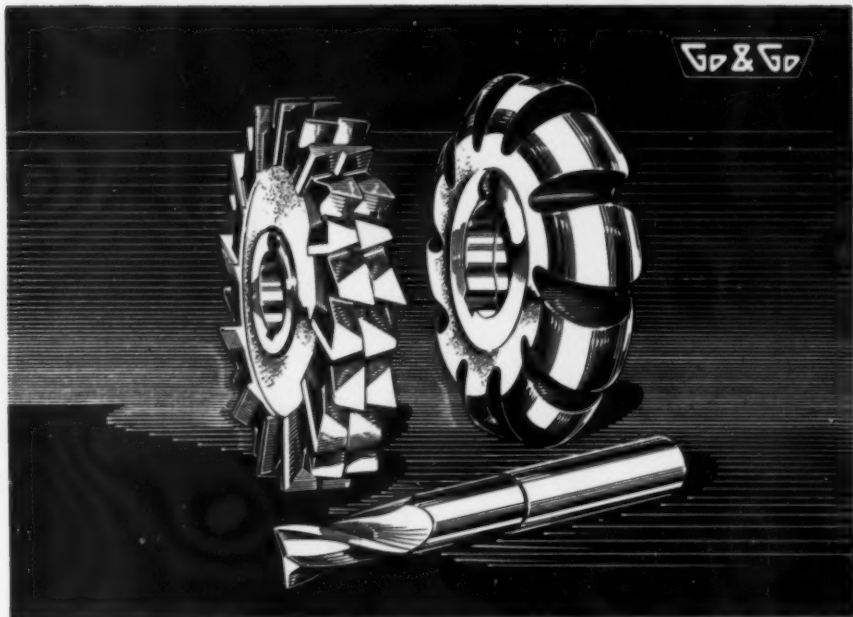
Equipped with over 300 hp, this 27-station machine automatically loads surface-broached castings, performs 80 operations and automatically positions two matched sets of bearing caps every 30 seconds on the conveyor ready for assembly. The machine drills, reams, taps, broaches, turns, mills, probes and faces. The broaching operation is unique, since for the first time

in a machine of this type the broach is not withdrawn from the hole by hand after the cut is made.

Here's how it works. At the broaching station, two castings are lifted out of the transfer mechanism and positioned by the broaching fixture. Four broaches, held by detents in upper collets, are fed down into previously drilled holes. The lower ends of the broaches are clamped by lower collets and the broaching cut is made, elongating the holes by .030". After the broaches have passed completely through the holes, the collets retract, providing clearance for the castings to be returned to the transfer mechanism. Then the upper collets descend, retrieve the



Four broaches in up position, fixture in position to remove castings from transfer mechanism.



Are solid high-speed steel milling cutters obsolete?

If they are someone ought to tell our customers about it. They've asked us to produce so many styles and sizes that we finally went all the way and stock the most complete line available anywhere.

No, the solid high-speed steel cutters haven't been obsoleted by the carbides. When it comes to the smaller production runs and toolroom use, the solid steel cutters are it. Here, they'll perform more than adequately at the lowest possible initial tool cost. And they're much easier to maintain than the more costly carbide cutters.

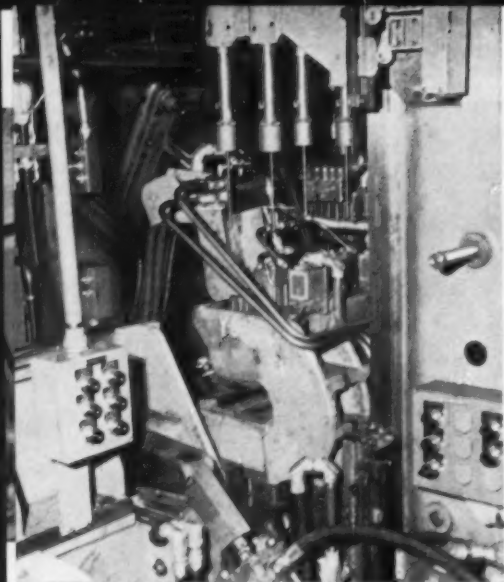
Even though Go & Go produces a lot of inserted blade cutters, we're just as proud of our extensive line of solid high-speed steel cutters. Every tool is engineered with the same care and over 38 years of milling cutter know-how goes into each and every one.

Catalog F covers the extensive stock of standards available. It's free on request.

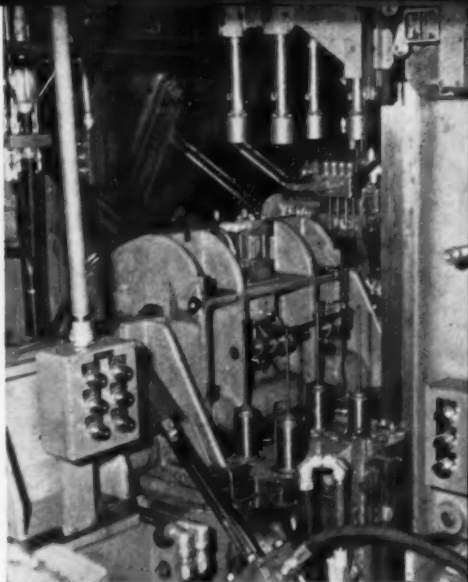
GODDARD & GODDARD COMPANY

DETROIT 23, MICHIGAN

Engineering and producing tools that Go & Go since 1917.



Fixture has removed castings from line and positioned them for broaching. Upper collets will descend, lower collets clamp broaches and cut made. Holes are elongated to provide lateral pin clearance.



Broaching fixture has returned castings to transfer line. Upper collet will descend, removing broaches from lower collets and position them for next set of caps.

News of Automation

continued

broaches and position them for the next piece.

The sawing station is also unusual with the casting again removed from the transfer mechanism and fed into the cutters. By mounting the saws stationary and moving the work, rigidity is greatly increased. Cutting speed is increased to 14 ipm, powered by two 40 hp motors. Employing carbide cutters, 2 castings are sawed into 5 separate caps and end-milled. All cuts are parallel within .0015".

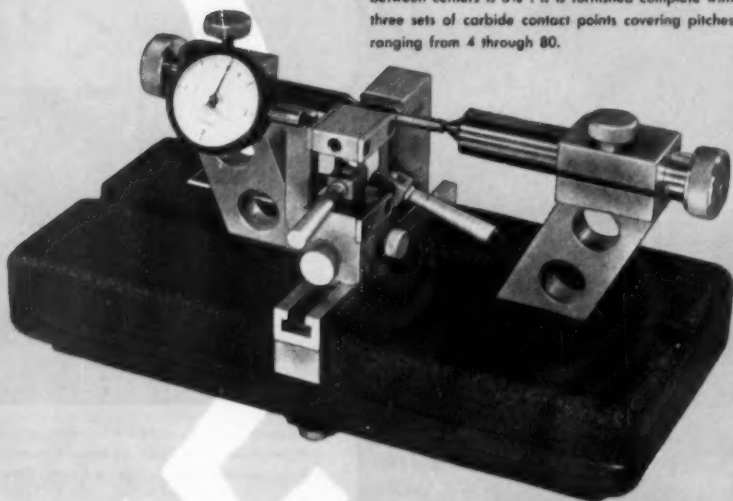
Natco built the first automatic transfer machine for processing bearing caps and at present is the only company building machines capable of processing full sets of caps simultaneously.

The present machine is the forerunner of six machines now on order with Natco, all of which will be equipped with more powerful sawing units. The new machines will have two 50 hp motors capable of 18 ipm cuts. • • •

NEW! DRUNKEN THREAD CHECKER

Now, with the PMCo Drunken Thread Checker, it is possible to accurately check another element—"drunken threads." This new instrument, developed after many years of study, is manufactured of the finest materials, by a team of expert craftsmen. It simplifies accurate reading of helix deviation.

The PMCo Drunken Thread Checker has a capacity up to 3½" diameter. Maximum measuring distance between centers is 5¼". It is furnished complete with three sets of carbide contact points covering pitches ranging from 4 through 80.



THE PIPE MACHINERY CO.

20100 Lakeland Blvd. • Wickliffe, Ohio

Greater Cleveland



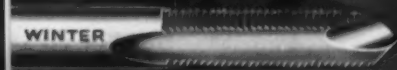
Today Get the Pipe Machinery Co. "Drunken Thread Checker" Pamphlet # 5, fill in this coupon.

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____

Use postpaid card. Circle No. 303



PRECISE
TAPER DESIGN



PRECISION CHIP
SHARP POINTS



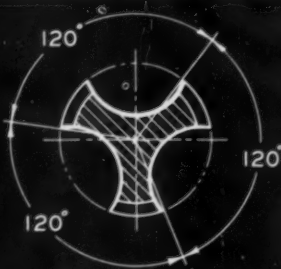
ACCURATE AND
CONSISTENT CHANNING



BALANCED ACTION brings you lasting satisfaction with your tapping operations

When tool manufacturing is planned and carried through with extreme care, you get exceptional accuracy and long tool life. Winter has provided this through the steady year-to-year increase in users of Balanced Action Taps.

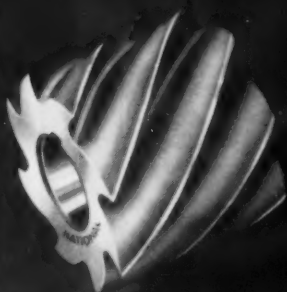
CALL YOUR
WINTER DISTRIBUTOR



Flute spacing must be exact in a tap that performs with Balanced Action. This is the first of four craftsmanship qualities manufactured into every Winter Tap.

WINTER BROTHERS COMPANY
Rochester, Michigan, U.S.A.

Distributors in principal cities, branches in New York • Detroit • Cleveland • Chicago • Dallas • San Francisco • Los Angeles • Division of National Twist Drill & Tool Co.



A search that never ends

The quest for better ways to cut metals is continuous in National's testing laboratories. When worthwhile improvements are found, the benefits are made available to you through better performance of National Tools.

NATIONAL TWIST DRILL AND TOOL COMPANY

Rochester, Michigan, U.S.A. Distributors in principal cities. Branches in New York • Detroit • Cleveland • Chicago • Dallas • San Francisco • Los Angeles

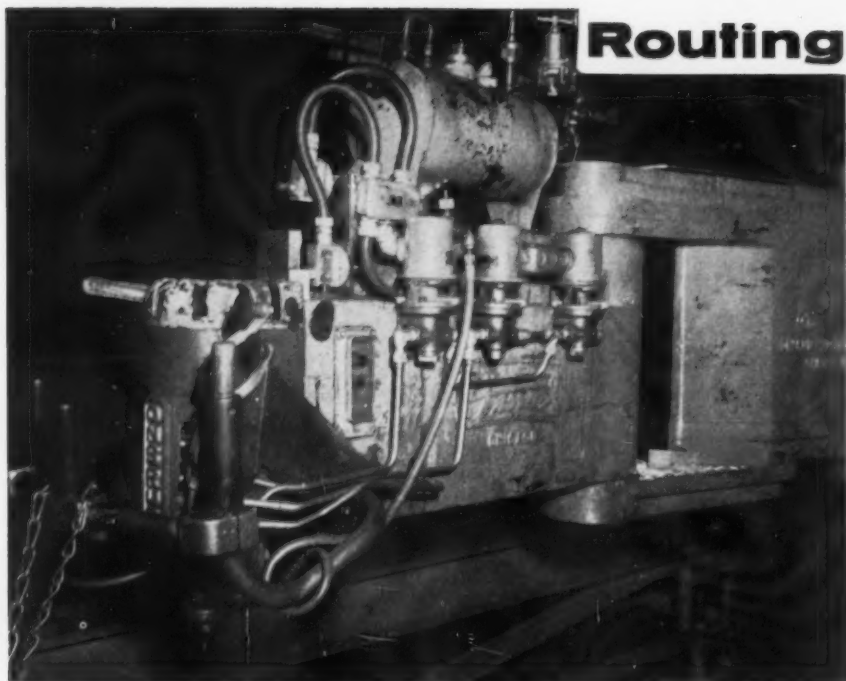


National

TWIST DRILLS
REAMERS
COUNTERBORES
MILLING CUTTERS
END MILLS
HOBBS
CARBIDE AND
SPECIAL TOOLS



CALL YOUR
NATIONAL
DISTRIBUTOR



1. RADIAL ARM ROUTER (Onsrud) which originally had a rapid traversing air cylinder and spring assembly was replaced with a Keller, 350 rpm traversing air motor, lead screw and push button controls. Electrical and air limit switch-valves insure safety to motor and lead screw, provide maximum travel limits.



Rolled Contoured Wing Skins

. . . with finger tip controls

How a standard Onsrud radial arm router was modified so that the operator, with finger tip controls, can adjust the router head to any vertical setting within the limits of the machine

By **Eugene Harp**
Boeing Airplane Co.
Wichita, Kansas

Problem and Method Employed

● Manually operated standard Onsrud radial arm routers are primarily designed for routing flat sheets of nonferrous materials to a desired profile. An adjustable positive stop is used to control the depth setting of the router bit in relation to the work. The router head is raised with springs and lowered with an air cylinder as shown in the attached photo, BW-74435.

Routing of rolled contoured wing skins with the standard Onsrud broken arm router presented a problem, inasmuch as the elevation

of the router bit had to be changed to conform to the vertical variation in the horizontal skin plane. The following three (3) methods were employed in making the router head vertical settings:

1. For each height adjustment, the operator raised the router head, manually adjusted the positive stop, then lowered the head to the new adjustment. Ordinarily two or three trials were made before the desired height was obtained, resulting in wasted machine time.
2. The operator controls the setting of the router head without the positive stop, by regulating the air control valve. Due to the inability to determine the exact



2. ROUTER HEAD originally was raised with springs and lowered with an air cylinder before the modification.

amount of pressure released by the control valve, it was extremely difficult to obtain accurate settings. This inaccuracy resulted in damage to the router blocks, wing skins and bits.

3. An operator's helper manually adjusted the positive stop progressively as the cut was made.

Solution to the Problem

The idea to the solution of the problem was to replace the original rapid traversing air cylinder and spring assembly with a Keller, 350 RPM, traversing air motor, lead screw and push button controls. The attached photos, BW-74433 and -74434 show the installation. The other photo shows a combina-

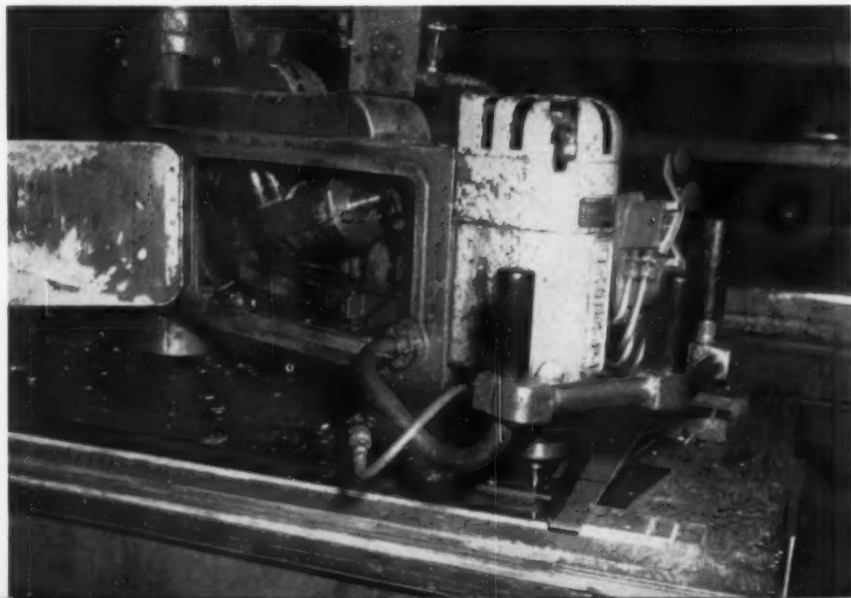
tion of electrical and air limit switch-valves to insure safety to the motor and lead screw, and provide maximum travel limits. In addition to eliminating manpower requirements, increasing production and improving quality of work, the operator fatigue was greatly reduced.

Twenty (20) consecutive working days were checked before modification of the machine, and twenty (20) days after the modification for comparative results and analysis. The following results were noted:

A. Old Method

1. Average number of skins routed per shift13.4

3. KELLER 350 rpm traversing motor as it was installed to replace the original rapid traversing air cylinder and spring assembly.





4. ANOTHER VIEW of traversing air motor installation.

2. Manpower requirements per shift 6
3. Skin rejections per year 20
4. Router block reworks per year 20

B. New Method

1. Average number of skins routed per shift 16.4
2. Manpower requirements per shift 4
3. Skin rejections due to router nicks 0
4. Router block rework due to router nicks 0

C. Summary

1. Production increase per shift 3 skins
2. Manpower reduction per shift 2
3. Wing skin rejection due to router nicks eliminated
4. Router block rework due

5. Saving Analysis:

- a. Reduction of manpower (2 x \$1.76 per hr. x 16 hr. day x 21.2 days per month) ..\$1,193.98
- b. Production increase resulted in a 480 manhour savings per month or\$ 940.00
- c. Elimination of router block rework\$ 41.50
- d. Elimination of skin rejections\$ 41.50

Total monthly savings	\$2,216.98
Gross yearly savings	\$26,603.76
Cost of project	\$1,608.18
Net savings	\$24,995.58

• • •



CEMENTED OXIDE CUTTING TOOLS are combined with carbides on this Sundstrand automatic lathe for finish machining transmission sliding gears. Tools converge on work from top, front and rear of part. As many as 3000 pieces per corner are produced with cemented oxide tools.

How Ford

In machining sliding gears for transmissions, 3 ceramic and 2 carbide tools are involved in modified Sundstrand automatic lathe set-up with these results:

- **Fewer tool changes—1600 cuts per tool edge**
- **Cutting speed increased from 450 to 970 sfm**
- **Reduced machine idle time from 4.16 to 1.87 hours per month**

• What's the answer—if cutting tools are changed too often—if cycle time per piece is too long—if finish is a problem and 100 per cent inspection impractical—if one machine is not enough and two machines too much to provide the number of parts required for production schedules?

Ford's Standard Transmission and Radiator plant in Dearborn, Mich., which faced this problem in machining sliding gears for transmissions, today believes it is on the threshold of the answer after several months actual production on an experimental basis.

The largest portion of the answer seems to stem from the new cemented oxide tooling material now under appraisal by many metal-working companies in the country.

Since applying cemented oxide on one of its many machining operations, Ford has been able to:

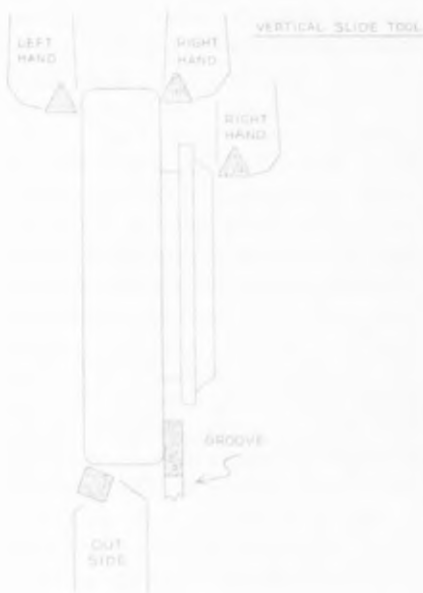
Reduce tool changes, shrink cycle time, increase machine speeds, shift one machine to other work, obtain consistent finishes with profilometer readings of 85 rms, all of which resulted in increased production.

Increased Production with Ceramic Tools

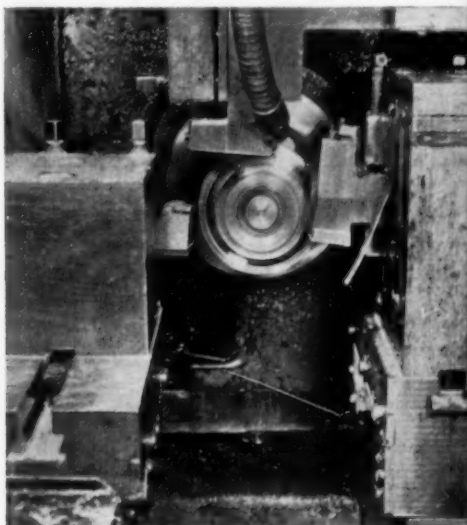
The cemented oxide cutting tools reduce tool changes by providing longer cutting life. Tools are changed at intervals of 8 to 16 hours—producing an average of 1600 cuts per tool edge. By increasing the cutting speed from 450 to

970 sfm, the actual cutting cycle is reduced accordingly.

Additional benefits included a reduction of machine idle time over a monthly period from 4.16 to 1.87 hours, and a reduction of monthly tooling requirements.



RELATIVE POSITION of carbide and cemented oxide tools employed for machining sliding gears.



TOOLING FOR MACHINING SLIDING GEARS includes carbides because ceramics were not applicable in all cases. Grooving tool, for example, is too narrow to be clamped. The right hand (rear) facing tool also does not clear the work on the return stroke, resulting in drag which impairs ceramic tools.

The work at Ford involves finish turning, grooving and facing the transmission low and reverse sliding gear on a Sundstrand automatic lathe. The automatic lathe itself is a standard machine modified by Ford engineers for the rigidity and speed needed to apply the cemented oxide cutting tools. Rigidity was obtained by taking up spindle bearings, and scraping the tool slides to minimize backlash as much as possible.

The part, of 5135 forged steel

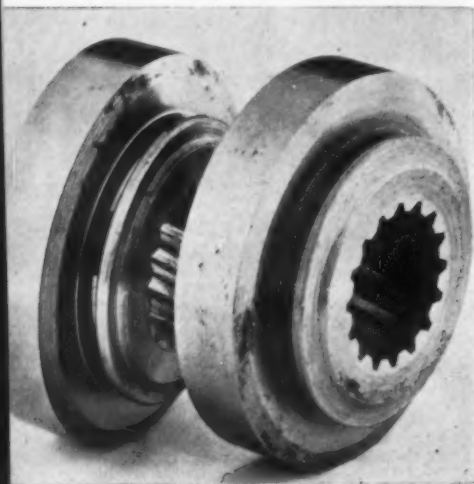
with a hardness of 170 to 207 Brinell, is the component that is used in the transmission of power through low and reverse gear range. It measures roughly a little less than 4-inches in diameter, and is rough machined on a Bullard 8-inch, 8-spindle Multimatic prior to being qualified on the Sundstrand lathe.

Insert type holders for "throw away" cutting tips are used on the lathe. The machine is tooled up so cutting tools approach, or converge on the work from three directions—front, top and back.

In the operation five cutting tools are involved, three of Carboloy cemented oxide 0-30, and two of carbide. A 1/2-inch square cemented oxide tool is used in the front holder for the work outside diameter, and two 3/8-inch, inscribed circle, triangular cemented oxide tools are involved in the back for facing cuts—with a carbide grooving tool between them to size the 5/16-inch deep, 0.203-inch groove. The top tool is a 1/4-inch inscribed circle, triangular-shaped carbide. A 0.015-inch feed is used at 970 fpm.

The work itself is held on a stub type, expanding arbor fixture with serrations. No coolants are used.

Previous to the application of cemented oxide, carbide tools were used in all tool holders in the setup.



SURFACE FINISH is consistently better with ceramic tools than with carbides used previously. Sliding gear, left, was machined with cemented oxide 0-30 cutting tools at 1000 fpm, while carbide was employed for the other gear at 450 fpm. Gears are previously rough machined on an 8-inch, 8-spindle Bullard Multimatic with conventional tools.

Besides a production average of only 350 parts per tool index, the carbides had a tendency to lose out in holding size, and coolants were required.

With cemented oxide tools, Ford tool engineers report, the outside diameter tool produces approximately 1200 parts per corner, and occasionally 3000 parts.

Holding size no longer is a problem despite the short cycle to complete each gear. The automotive engineers also foresee possibilities of increasing surface speeds to 1500 fpm—if tools can be found for the other cutting positions to match the pace of the three cemented oxide tools, and if more rigidity and speed can be provided in the machine. • • •

BOOK REVIEW

MACHINE TOOL LEASING, by J. L. Treynor and Richard F. Vancil. 147 pages. Management Analysis Center, Inc., 275 Newbury St., Boston 16, Mass. \$15.00.

As a preliminary to a discussion of the cost aspects of the buy-or-lease decision, a chapter is devoted to an explanation of two important concepts: the "desired earnings rate" and "present value."

After a discussion and appraisal of the advantages of machine tool leasing, both claimed and real, the book proceeds to the major question of cost considerations. Machine tool leasing today offers the equipment user a free

choice of either outright purchase or lease, with the better alternative being principally determined by the cost characteristics in each specific situation.

The problem posed to the equipment user is therefore essentially one of cost measurement and of making a valid comparison between the true cost of purchasing and the true cost of leasing. But the problem is considerably complicated by the existence of over a dozen different leasing plans, each with varying contract terms regarding annual payments and length of life. Further complications arise because of the tax status of lease payments compared to depreciation on owned equipment, and because of lack of data about salvage values for used equipment.

Nevertheless, for any given set of circumstances, it is a fact that one method of acquisition does have a cost advantage over the other. The authors present a concise way of resolving the problem, built around a set of "Table of Realization Values," one table for each of the 16 plans that were examined.

There are three important variables that must be known or assumed in any cost comparison between outright purchase and a lease agreement: (1) the number of years the machine will be used, (2) the estimated salvage value when retired, and (3) the rate of return that an investment in the machine should earn. The Tables of Realization Values show figures, for all reasonable combinations of rates of return and useful life, that represent the salvage value which must be realized if the costs of buying and leasing are equal.

AMES



NO. 2W DIAL COMPARATOR

NO. 26 AMPLIFYING COMPARATOR



MODEL 130 GP.

For fast, accurate measurements, Ames Dial Comparators are the choice of quality control men everywhere. You get definite, impersonal readings directly from the dial. There's no guesswork or figuring.

Special comparators are available for measuring resilient materials such as rubber, paper, etc., and for measuring non-yielding materials such as sheet metal, glass and plastic. Write for complete details.

Representatives in principal cities



B.C. AMES CO.

28 Ames Street, Waltham 54, Mass.

MANUFACTURERS OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

Use postpaid card. Circle No. 306

MACHINE and TOOL BLUE BOOK

HOW WOULD YOU DECIDE

MACHINE AND TOOL

blue book

This is a roundup of day-to-day in-plant problems and how they were handled by management men. Each incident is taken from a true-life grievance which went to arbitration. Names of some principals involved have been changed for obvious reasons.

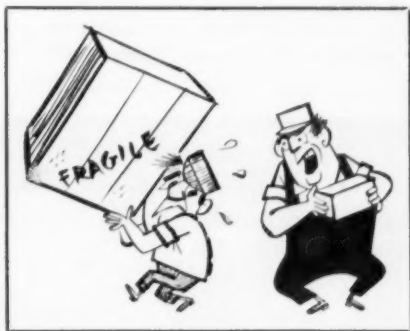
Can you fire a man for trying to get another worker to slow down?

What Happened:

When the foreman assigned a heavier work load to the men in his department, Jack Weaver got through it, though he had to hustle. In the locker room, after the shift, Dave Harman approached Weaver aggressively and said, "You bum! Waddaya tryin' to do—bust the rate? Slow down and take it easy!"

"You tend to your job and I'll tend to mine," said Weaver, walking off. Harman yelled after him. Weaver told the foreman, and Harman was bawled out. The next day, in the shop, Harman said to Weaver, "A stool pigeon as well as a bum! Why don't ya keep your big mouth shut?"

"Ah, scram," replied Weaver and again complained to the foreman. Next day, Harman was fired. He appealed and the case went to arbitration. The foreman claimed:



1. Harman caused a disturbance by calling Weaver foul names.
2. He tried to get Weaver to slow down during the trial period of a new schedule, which is dishonest.

Harman protested:

1. This is a first offense of using foul names, so discharge is too harsh.
2. Maybe he tried—but he didn't actually get Weaver to slow down, so no harm was done.

Right or Wrong

continued

Was the Foreman:

RIGHT ☐ WRONG ☐

What Arbitrator Douglas Maggs Ruled:

"Harman's profane language, as a first offense, warranted nothing more than a warning. His attempt to induce Weaver to 'slow down' probably warranted a disciplinary layoff, but it did not warrant, even when coupled with the profane language Harman used, the ultimate penalty of discharge. The situation is distinguishable from one in which a worker has caused his fellows to work at an unreasonably low speed. Harman did not

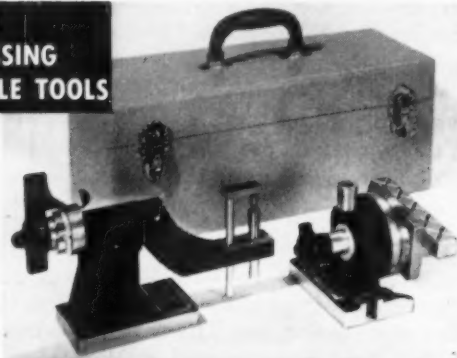
succeed in inducing Weaver to slow down.

"Harman did rebuke Weaver for having complained to supervision about what Harman had done. Whether viewed by itself, or in conjunction with Harman's other offenses, this misconduct did not warrant the ultimate penalty of discharge. Resentment of 'talebearing' is inculcated in children in our society. Nevertheless, employers may properly treat as an offense warranting some disciplinary penalty, action prompted by such resentment which interferes with production. But discharge is an unduly severe penalty for one guilty of a first offense of this kind. My conclusion is that the company did not have just cause for discharging Harman."

Now ANGLE TANGENT TO RADIUS WHEEL DRESSING WITH NEW VERSATILE TOOLS

**MIGHTY GOOD AT ANY PRICE
BUT TOPS AT ONLY \$149.50**
(Both tools including diamonds)

The G-5 RADIUS DRESSER is a precision engineered tool that will dress either a convex or a concave radius from .015" to 1.750" on a 7 inch or 10 inch wheel, and it may be set to the exact radii desired. Graduated stops allow you to dress any desired portion of a radius. The spring tension journal insures chatter-free operation. The G-2 ANGLE DRESSER AND TOOL HOLDER is actually two tools in one, having an easy to read vernier scale 0° to 180° giving accuracy within 2" of 1"; an excellent time saver to set up small jobs to be milled, drilled, tapped, etc., on any desired angle.



Our fixtures will dress most radii and angles tangent to each other, similar to those shown below.

FREE handsome, wooden storage box.
Write for complete information.

Distributorship available in select territories.

R O T H F U S S T O O L

COMPANY

BOX 22, ELMWOOD STATION

PROVIDENCE 7, R. I.

Must you pay a helper a higher rate for any skilled work he does?

What Happened:

Maintenance helper Merwin Rush was assigned to help Don Rahorn, a journeyman. Most of Merwin's work was preparation and cleanup. When he relaxed between these chores, Rahorn handed him some tools, saying, "You're not going to sit around doing nothing. Make yourself useful."

Under Rahorn's direction, Merwin worked at some of the journeyman's simpler chores. After a few months of this, Merwin asked to be paid the journeyman's rate for the work he'd done. The company said "No." Merwin appealed, and the



case came to arbitration.

Merwin argued:

1. It said in the contract that a worker temporarily assigned to another classification would be paid the rate for that classification.

Quality Control plus Cost Control

Wilder MICRO-PROJECTOR with VERTICAL LIGHT BEAM

New model long range measuring stage
1" x 4" reading to .0005".

DO IT BETTER

Full set of lenses between
10X and 100X magnifica-
tions.

QUICKER

Completely versatile. Avail-
able as a basic unit for
production inspection or as
a completely equipped con-
tour measuring projector.

AT LESS COST

Write for FREE new 12 page catalog.

OPTO-METRIC TOOLS, INC.

137 MT VARICK STREET • NEW YORK 13, N. Y.





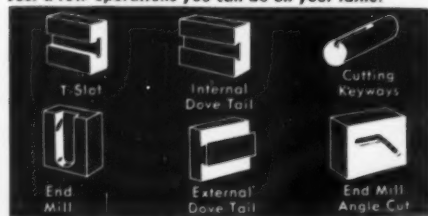
in 10 seconds with the
PALMGREN
 MILLING ATTACHMENT



No. 250

Now, in your own shop, on your present lathes, you can do such jobs as Milling, Slotting, Grinding, Grooving, Sawing at angles, recessing and many more complicated jobs easily and quickly with the Palmgren Milling Attachment. Yes, in just 10 seconds you can convert to any of these operations and save time and money doing work you formerly had to send out. Precision built, graduated for rotary angle and vertical adjustments, easily mounted on all makes of lathes by straddling tool post, this attachment has proved highly valuable in thousands of shops, both large and small. Three sizes: jaw widths 1½" \$18.75; 2½" \$24.75; 4" \$39.75. Available NOW! Get more out of your lathes by using these Palmgren Milling attachments. Write today.

Just a few operations you can do on your lathe!



CHICAGO TOOL & ENGINEERING CO.
 8384 South Chicago Ave., Chicago 17, Illinois

Use postpaid card. Circle No. 309

Right or Wrong

continued

2. He actually did some of the journeyman's chores.
3. As long as he did journeyman's work, he temporarily was in the journeyman's classification and should be paid for it.

The company countered:

1. The maintenance helper classification was set up as a training ground for promotion.
2. The only way a helper could fit himself for promotion was by doing some of the chores of a higher job.
3. The description of the helper's job said in black and white—"Under close direction may perform assigned tasks."

Was the Company:

RIGHT ☐ WRONG ☐

What Arbitrator Maurice Merrill Ruled:

"The work was relatively simple and did not call for exercise of the higher skill of journeyman. Merwin Rush is not a journeyman and needed more experience if he was to gain proficiency. There is no showing that, over a substantial period of time, the helper was used with regularity in skilled work or that a significant proportion of the total skilled work was done by a helper."

"The company has a policy of promoting employees to higher ranks and encouraging them to qualify for promotion by acquiring skill in the line of succession. The work in which Merwin Rush was engaged would increase his skill in such lines. I come to the conclusion that the grievance must be denied."

Can you make a worker retire at 65 when the contract says nothing about retirement?

What Happened:

The company removed John Marnik from the payroll because he had reached the compulsory retirement age of 65. This had long been the company's policy, though there was nothing in the contract about retirement. Marnik objected, and this became the first formal grievance on the subject. It went to arbitration. Said Marnik:

1. The contract said nothing about retirement, so the company couldn't take him off the payroll except for layoff or for cause.
2. Some workers had been kept on after they got to 65.

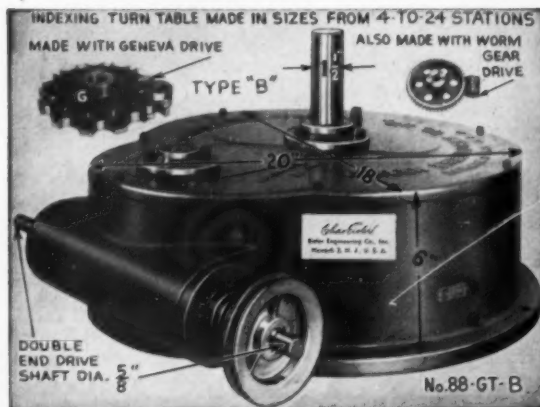


3. The company didn't have the right to set a compulsory retirement age of its own.

The company argued:

1. It had long had a regular policy, known to everybody, of retiring workers at 65.

INDEXING MACHINERY — CAMS — GENEVA GEARS — TURNTABLES



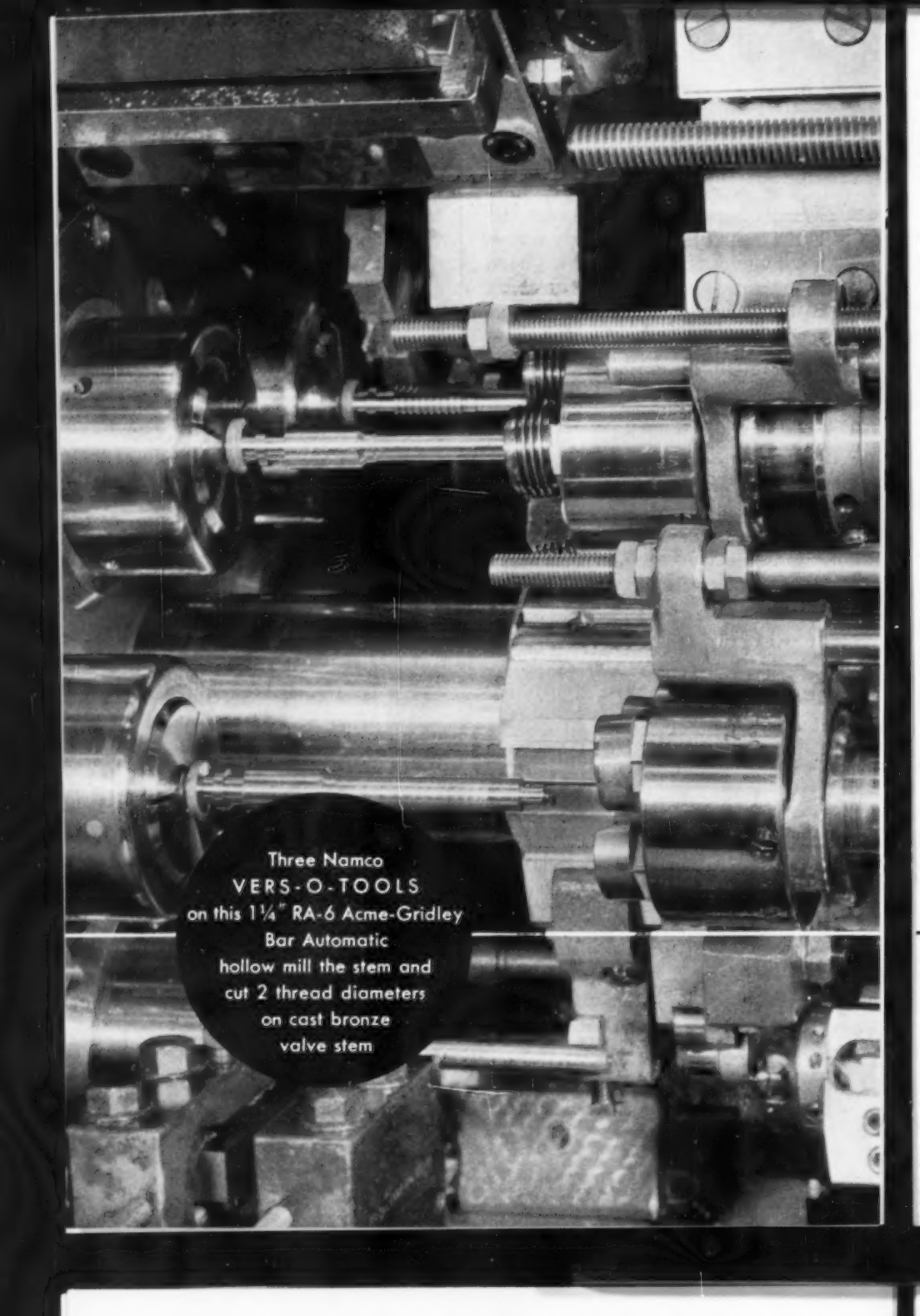
MFG. REP. WANTED
DR. CHARLES EISLER ME. FOUNDER

ASK FOR CATALOG No. 88-57
CHARLES EISLER, JR. PRES.

EISLER ENGINEERING CO., INC.

762 SOUTH 13th STREET

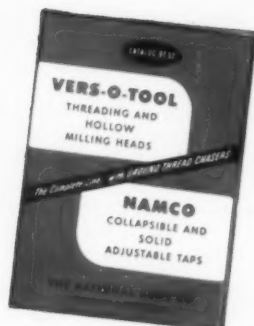
NEWARK 3, NEW JERSEY



Three Namco
VERS-O-TOOLS
on this 1 1/4" RA-6 Acme-Gridley
Bar Automatic
hollow mill the stem and
cut 2 thread diameters
on cast bronze
valve stem

Namco **VERS-O-TOOL**

**lets you use the same head...
with chasers for threading...or with
cutters for hollow milling**



Write today for your copy of
48-page Catalog DT-52 or
ask our representative to call.

CIRCULAR CUTTING TOOLS reduce costs on
threading jobs, end forming and turning.

GROUND THREAD CHASERS provide more threads
per grind — and you can regrind to a full
270° of chaser circumference.

BASIC DESIGN SIMPLICITY — fewer moving parts—
insures long, trouble-free performance.

NAMCO CHASER GRINDING SYSTEM permits cut-
ter settings to be made in the toolroom with-
out head adjustments — no need for trial
error run after sharpening.

National Acme

THE NATIONAL ACME COMPANY, 177 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES: • Newark 2, N. J. • Chicago 6, Ill. • Detroit 27, Mich.

DO YOU MAKE?

- Plastic, Rubber or Glass Molds
- Forging or Die Cast Dies
- Contoured Parts for Ordnance or Aircraft



**YOU CAN SAVE
UP TO 60%**

**Now 2 Major Improvements
on the Fluid Motion**

REGENT DUPLICATOR

**NEW . . . ADJUSTABLE
FRICTION BRAKE**

For Selective Table Sensitivity

**NEW . . . CIRCULAR
BALL BEARING RACEWAYS**

For Even Smoother Table Movement

**MOUNTS IN MINUTES ON YOUR
BRIDGEPORT AND CINCINNATI
TOOLMASTER MILLS**

Capacity 6" x 6" — 1 to 1 ratio with
master. 2 or 3 dimensional with great-
est accuracy. Single lever table control.
Table "floats" on precision balls.

For literature write to

J. M. KALINS & CO.

1575 Railroad Ave., Bridgeport, Conn.

REGENT

2. What exceptions it made were due to the labor shortage during World War II and the Korean War.
3. Since the contract didn't say anything about retirement, it had the right to set a compulsory retirement age.

Was the Company:

RIGHT ☐ WRONG ☐

What Arbitrator Joseph Shister Ruled:

"Where the contract is silent, the issue must be resolved by an appeal of that logic and equity which takes full account of the interests of both parties. Such an appeal leads to this response: the company does have the right to establish a compulsory retirement age for its employees provided that it can demonstrate that such a policy is not unreasonable.

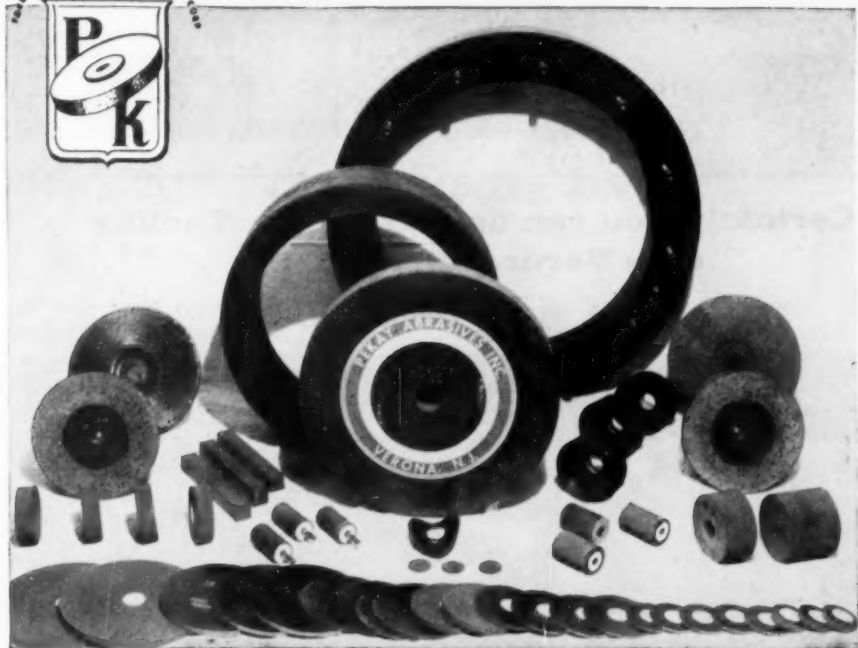
"In the absence of a standardized compulsory retirement age, the company would have to judge each case separately. Not only would that impose an undue administrative burden on the company, but it would inject considerable subjectivity into the problem with the result that grievances, arbitration and conflict would be encouraged. The logic behind the company policy is reinforced by well-established precedent.

"Ever since the union obtained bargaining rights, and long before that as well, the company has pursued a policy of compulsory retirement at age 65. True, 10 workers were employed by the company beyond the age of 65. But all of these cases involved special circumstances which warranted the company action, and in no way contradicted the general policy of compulsory retirement at 65. Is 65 a reasonable age for retirement? Whatever the psychological, economic or sociological shortcomings of this figure, the irrefutable fact is that it is in widespread, almost universal use as a benchmark for retirement in America. The grievance is denied."

Use postpaid card. Circle No. 312



A complete line of custom Abrasives



Are you grinding with 1957 model grinding wheels or just letting the old "metal burner" do?

Let us show you what real wheel development is. For example, a flexible rubber bonded wheel that operates safely at 16,000 f.p.m.

Let Pekay show you the way.

Send For Complete Information.

PEKAY ABRASIVES, INC.

271 GROVE AVENUE

VERONA, NEW JERSEY

CENTER 9-4600-1

Use postpaid card. Circle No. 313

Die Cushions for Forming Dies

By D. A. Rogers

● It is quite imperative that a short radius be introduced on a given forming die such as shown at (S). Sometimes this compensates for lack of spring space in the overall die height for ejection purposes or holding a given part for the forming operation such as shown in fig. 1.

In such cases a spring is not only short-lived, but mechanically incorrect, and when the greatest holding spring pressure is needed at the beginning of point of operation, the springs are extending the minimum pressure against the pressure pad. Sometimes there is

an excessive pressure at the bottom of the work cycle where it is not needed.

By the introduction of a die cushion (air cylinder) (A), shown in Fig. 2, a larger radius at (L) can be easily introduced even with a limited overall height of the die design (H).

The larger radius (L) requires less working pressure from the punch press to form a given part to size and shape, and has a definite tendency to reduce the die marks on the finished formed piece to a minimum, thus eliminating compound distortion in the

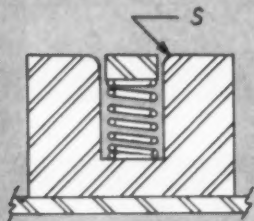


Fig. 1

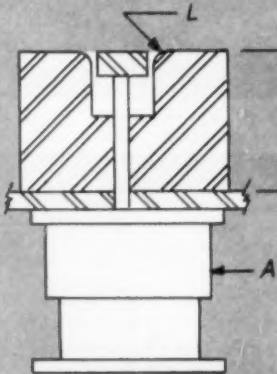


Fig. 2

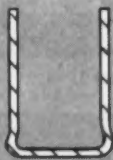


Fig. 3

finished parts such as shown in Fig. 3.

It also provides more security on holding pad against the piece part to

be formed during the work cycle, thus preventing it from slipping, slewing—assuring a more satisfactory practical finished piece. • • •

Drill Jig for Straight and Angular Holes

By **Henry George**

● A common problem in most shops is to drill both straight and angular holes with a drill jig. The usual solution to this problem is to slip an angular nest under the jig in order to drill the holes at an angle.

A hinged leg on the end of the jig is a good way of lifting the jig up to the correct angle. It eliminates the

possibility of losing or misplacing the nest or of placing the jig in the nest in the wrong position. Fig. 1 shows the jig in position for drilling through bushings Y and Z. Fig. 2 shows the jig in position for drilling through bushing X. In each position the spring holds the leg firmly against the correct stop pin. We have used this idea on a number of drill jigs and it has always proven satisfactory. • • •

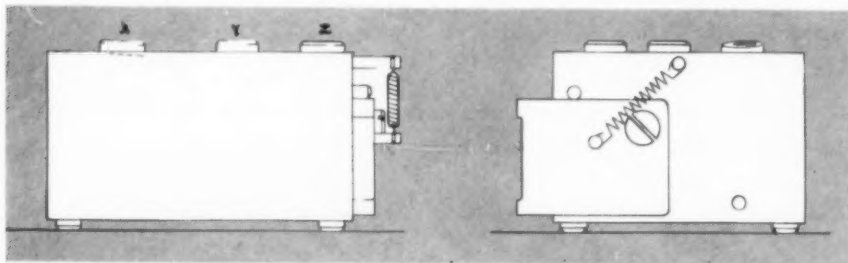


Figure 1.

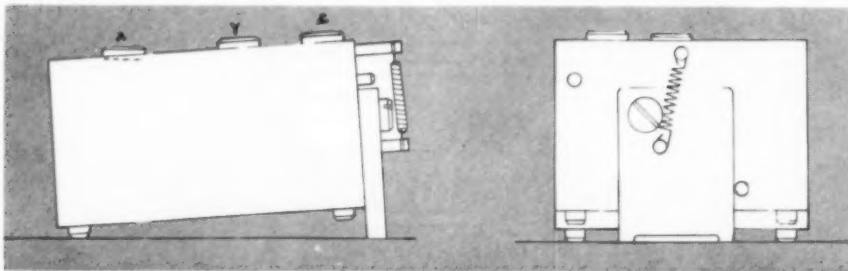


Figure 2.



"RODGERS PLATEN PRESS GIVES US

FAST CYCLING
WITH
COMPLETE SAFETY"

—SAYS VEIT AND YOUNG

Rodgers 400-ton platen press in use at Veit and Young, Huntingdon Valley, Pa., metalworking specialists. The press is equipped with die cushion, fast cycling cylinders and other accessories. Some of the products formed are stacked by the press.

Production has been increased in drawing and forming large serving trays and electrical panels by Veit and Young with their Rodgers Platen Press. Safety controls permit operators to concentrate on speed and accuracy. They are working type 303 stainless steel, brass, carbon steel, aluminum—from $\frac{1}{32}$ " to $\frac{1}{8}$ " thick with bends up to 90°.

Auxiliary cylinders lower and

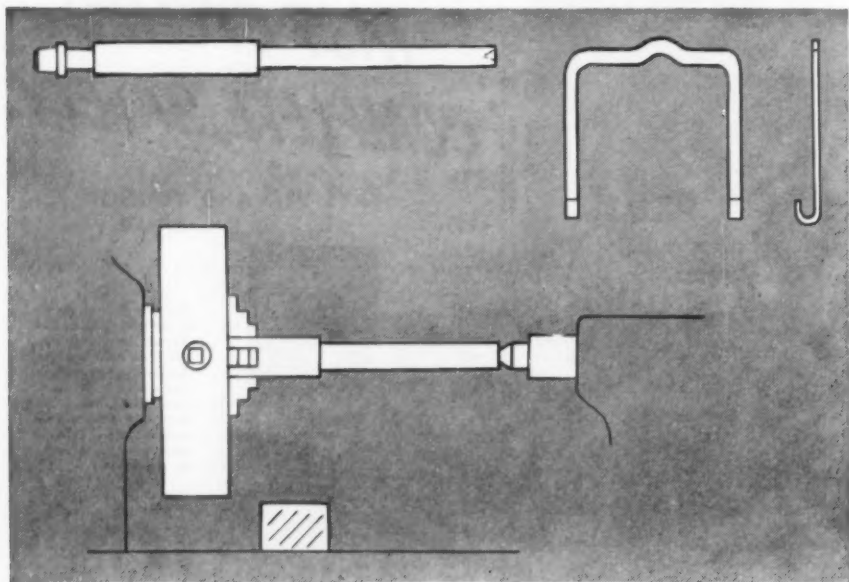
raise platen quickly for fast cycling. Forming pressures are preset from 80 to 400 tons—die cushion up to 50 tons. Simple, fast adjustments govern all platen, pressure and time cycles. If you work in metal, plastic, rubber, veneers—you can mold, draw, form—*faster* with a Rodgers Platen Press. Capacities 10 to 600 tons. Send for Rodgers "Blue Ribbon" Platen Press Catalog.



Rodgers Hydraulic Inc.

7453 WALKER STREET • MINNEAPOLIS 26, MINN.

Use postpaid card. Circle No. 315



Faster Removal, Replacement of Chucks in Lathes

By Clifford Molloy

● We have a large number of lathes in operation in our shop and like so many others we face the frequent task of removing chucks and also replacing them in the lathes.

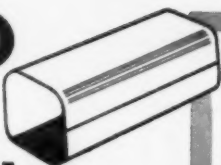
We made up a bar as shown in the drawing. One end has a collar welded in place and a short taper turned on the end. This taper fits the spindle taper but the collar prevents it from entering the spindle far enough to lock on the taper. The other end is center drilled. A short length of tubing is slipped over the bar. To use this tool the taper is slipped through the chuck

into the spindle and the collar is forced against the spindle nose with the tail center as shown.

The tube is slipped into the chuck and the jaws are closed to grip the tube. The chuck is now unthreaded from the spindle nose and pulled out a few inches on the bar. A wood vest is placed across the bed below the chuck and the tail stock is backed away to allow the weight of the chuck to rest on the cross support. If the chuck is small it can be lifted off by one or two men using the bar as a handle. For larger chucks a lifting yoke as shown can be used in conjunction with a hoist.

This little device makes a quick and safe operation of a job which ordinarily possesses hazards. ● ● ●

HOW TO form a rectangular shape



with the

DI-ACRO ROLLER

Forming small and large circles without flat spots and a variety of other sheet metal shapes is easily accomplished on the Di-Acro Roller with its *exclusive cam actuated Idler Roll*. Consult the yellow pages of your phone book for the name of your nearest Di-Acro distributor or write for six page instruction folder.

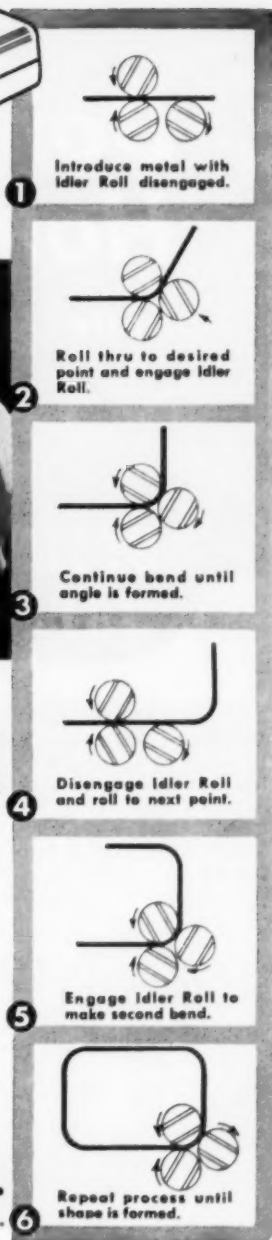
pronounced die-ack-ro



O'NEIL-IRWIN MFG. CO.

314 Eighth Ave. • Lake City, Minn.

Use postpaid card. Circle No. 316



Doing the Hole Job-

Better, Faster, at Lower Cost

BESLY TAPS

**with UNSURPASSED
ACCURACY
at all vital points**

● LET US PROVE that Besly can help you get better threaded parts, longer tap life and lower tapping costs. Ask your authorized Besly Distributor for a TRIAL RUN on your toughest jobs . . . PLUS details on Besly's Super-Service on "Specials".



Tru-Square
DRIVER



Mirror-Finish
FLUTES



Solid-Ground
THREAD FORM



Accurate
RAKE ANGLE



Microcentric
CHAMFER



BESLY-WELLES CORPORATION

Established as C. H. Besly & Co., 1875
122 Dearborn Avenue, South Beloit, Illinois



TAPS



DRILLS



REAMERS



GAGES



CARBIDE
TIPPED
TOOLS

Use postpaid card. Circle No. 317

FIELD REPORTS OF EQUIPMENT IN ACTION

MACHINE AND TOOL

blue book

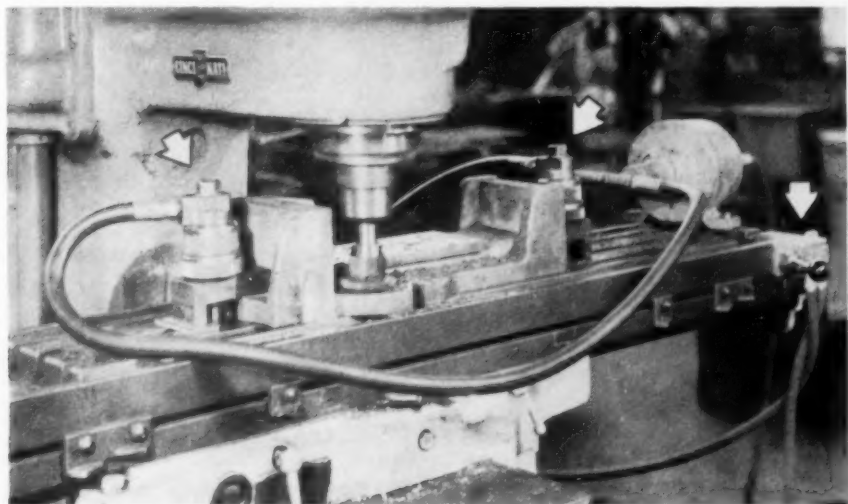
Automating Standard Fixtures

SCHILLER PARK, ILL.—Air hydraulic setup clamps, developed by the Wilton Tool Mfg. Co., Inc., provide a low cost means of automating existing fixtures for increased production.

PowRlocks might be described as a bridge clamp with instant locking action, except for the fact that they perform many more jobs than any single type of manual clamp. At the touch of a control, compressed air from the factory system enters an air-hydraulic booster, which, in turn, exerts tre-

mendous locking force on the Pow-Rlock head.

From one to 16 heads can be operated simultaneously, to clamp a work piece directly to a machine table; to clamp a work piece to a production fixture; to lock together two or more parts of a production fixture; to lock together two or more mating parts of a work piece; or to exert direct force as a small hydraulic ram or press. On all of these applications, two important advantages are gained. First, the in-



ARROWS SHOW the air hydraulic setup clamps in action.

stant action of these clamps increases the amount of productive work performed by men and machines. Second, the greater clamping force exerted eliminates chattering and increases the life of milling cutters and other tools.

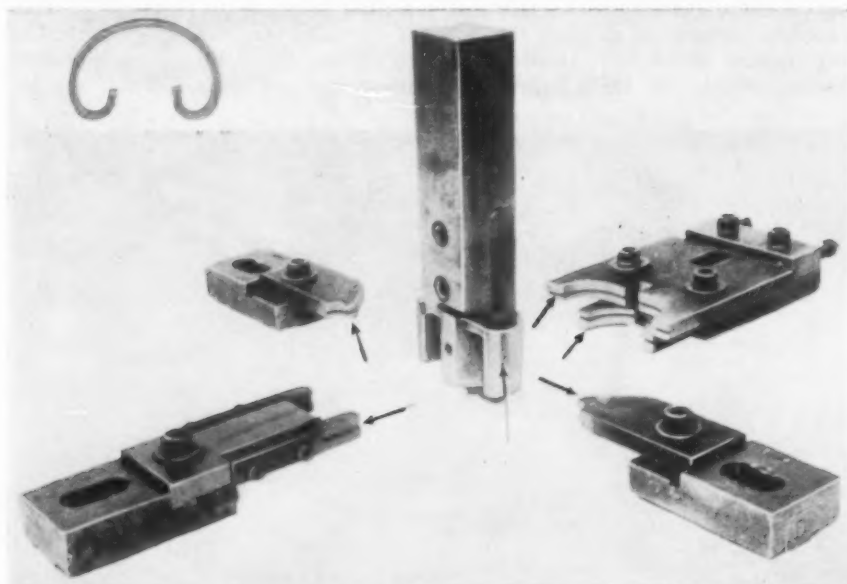
Clamping heads and boosters are available in a range of models and sizes suitable for most common clamp-

ing operations, and can be installed on most existing fixtures. One to four clamping heads with matching T-Slot nuts, air controls, an air hydraulic booster, a rapid return valve, and all necessary air and hydraulic hoses with pre-assembled fittings are included as standard parts of each PowRlock system. . . .

Production of Wire Forms Increased 74 Per Cent with Flame-Plating

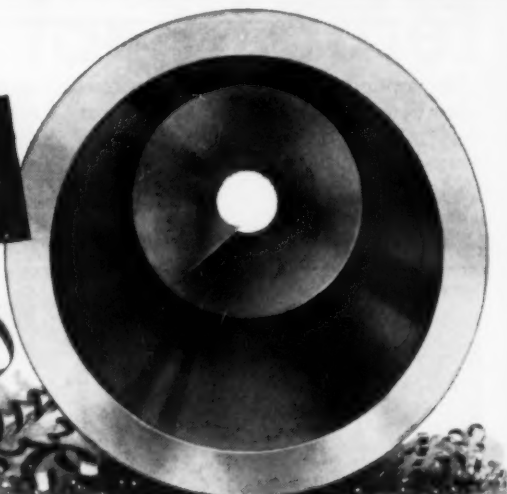
NEW YORK, N.Y.—By flame-plating wire forming mandrels with tungsten carbide, one manufacturer increased

production by 74 per cent. The wire forming tools illustrated, slide in a horizontal plane to make a wire spring or



SURFACES AND GROOVES of these wire forming tools which come in contact with the spring wire stock have been flame-plated with tungsten carbide for extra wear resistance. One manufacturer reports that these flame-plated tools last 10 times longer in service than hardened steel parts.

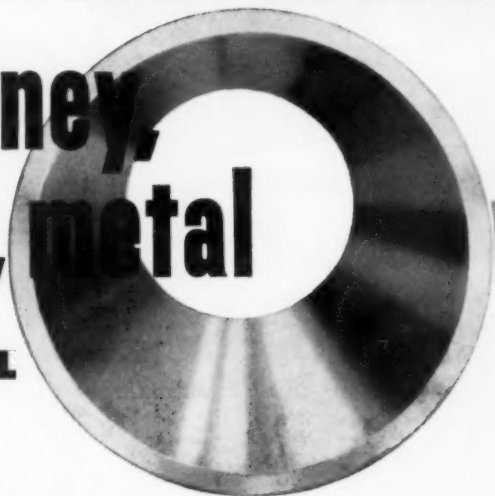
what price
WASTE?



**save money,
minutes, metal**

**with
B&W MECHANICAL
TUBING**

CARBON • ALLOY • STAINLESS



Countless hollow parts and products now being made from solid stock can be fabricated more economically from tubing. The hole is there, eliminating heavy drilling with all its attendant waste. And the wide range of sizes, shapes, analyses, finishes and heat-treated conditions in which B&W Mechanical Tubing is available, make it a semi-finished product in itself — reduce all your machining operations to the minimum.

Get the facts on savings from Mr. Tubes, your link to B&W and your local B&W tubing distributor.

Write for Guide to the Use of Seamless Mechanical Tubing, Technical Bulletin 340.

The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.



Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels

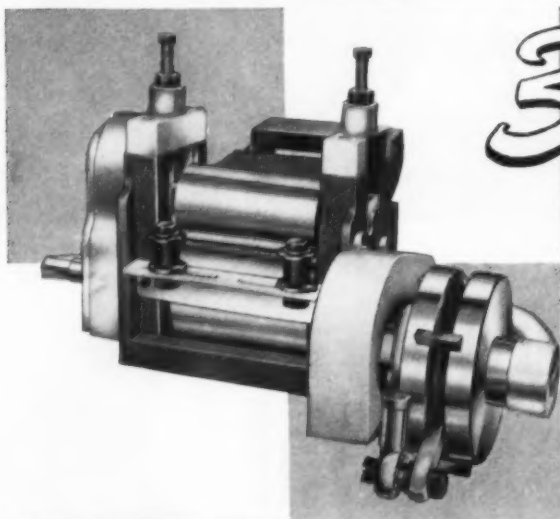
Field Reports

continued

clip around a vertically positioned mandrel. A hard, wear-resistant coating of tungsten carbide was flame-plated on all surfaces of the forming tools which come in contact with the spring wire stock.

The flame-plated tools were reported

to last ten times longer in operation than the previously-used hardened tool steel parts. In addition, it was discovered that the machines speed could be increased from a normal 45 pieces per minute to 78 pieces per minute. . . 74 per cent increase in production.



3

**REASONS
"RFC"
AUTOMATIC FEEDS
ARE YOUR
BEST BUY**

**REVERSES
INSTANTLY**

*A flick of the
finger.*

**FEEDS IN
THOUSANDTHS**

Amazingly accurate.

**MAINTAINS
ORIGINAL SETTING**

*No ratchets to
wear down!*

MODELS TO FIT ALL PRESSES

WRITE FOR CATALOG SHEET

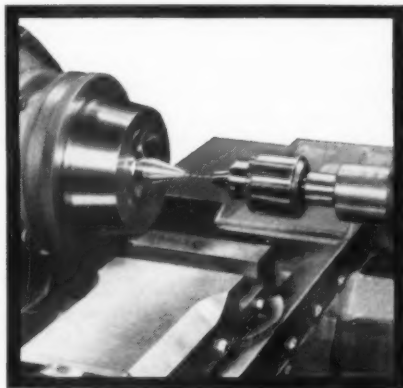


Roll Feeds Corp.
ASHTON, R. I.

Use postpaid card. Circle No. 319

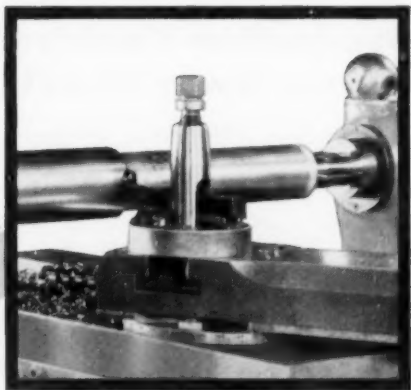
MACHINE and TOOL BLUE BOOK

Rivett's 2 for 1 Lathe!



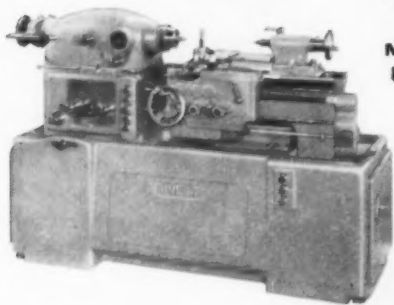
Sensitive...

As An Instrument Lathe
Responds to the lightest touch
of the operator. Turns within
.0004" in 12" length!



POWERFUL...

As An Engine Lathe
Full horsepower transmitted to
spindle. Takes 1/4" chip with
.020" feed on cold rolled steel.



Model 1020S "Steelway"
PRECISION TOOLROOM LATHE

This lathe has long been recognized as the top tool by master mechanics. Now, its adaptability and usefulness highlight its productivity. As one satisfied user states, "Our toolmakers go to a Rivett first in preference to our other lathes!"

RIVETT LATHE & GRINDER, INC.
Dept. MTR 1 Brighton 35, Boston, Mass.



Go to Rivett now for
information about this
big, beautiful machine.
Send for bulletin 1020B.



Field Reports

continued

The four flame-plated forming tools were left in as coated condition (about 125 micro-inches rms). However, the tungsten carbide coating in the vertical mandrel was brush finished to 50 microinches rms to provide a smoother surface.

Flame-Plating, a service of Linde Air Products Co., a Div. of Union Carbide and Carbon Corp., is being used by manufacturers throughout the country to solve wear problems on many parts and tools.

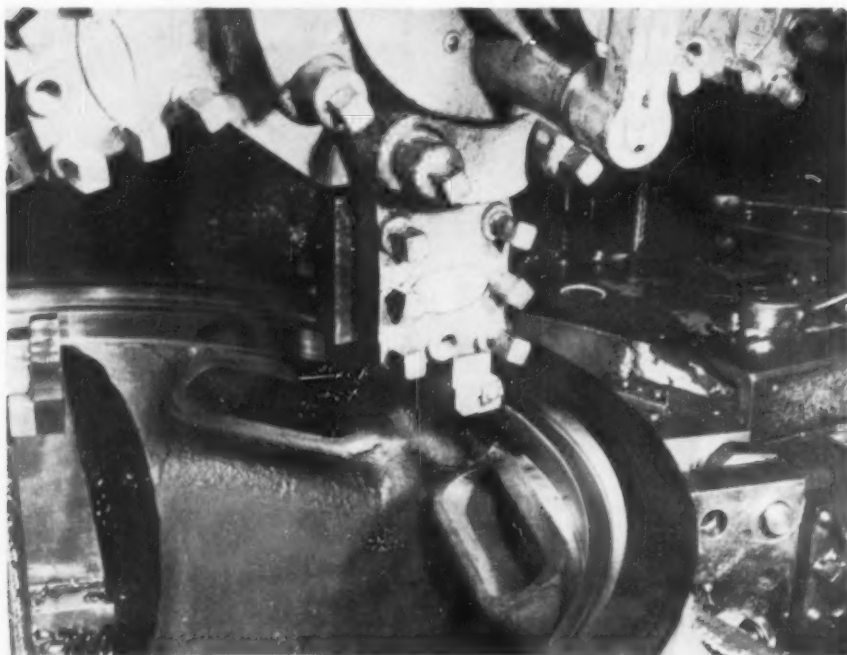
• • •

Production Doubled with Throw-Away Inserts

LATROBE, PA.—Throw-away button inserts made by Kennametal Inc. are used to turn, face and bore the 38½-inch

diameter pieces of cast armor in an eastern plant.

These armor parts have a Brinell



MACHINING OPERATIONS per cutting edge on this cast armor part were doubled when standard brazed carbide tools were replaced by Kendex tooling with "throw-away" button inserts. Grinding was eliminated.

hardness of 280 to 300 except in some chilled spots that are still harder. Furthermore the bottom of the bore requires severe interrupted cutting. With standard brazed carbide tools only one piece could be machined per grind on roughing and three pieces per grind on finishing cuts.

A 100% improvement was made by changing to heavy-duty Kendex indexable insert tooling. Two castings are now rough machined per cutting edge and six pieces per cutting edge are finish machined. These parts are machined on two 54-in. Bullard Cut-masters. Depth of roughing cut is 1/4 in. to 7/16 in. with feed of .015 in. at 270 SFM.

For roughing the face and shoulder, a style KBR-24 tool with rectangular insert is used. Since this insert has four cutting edges, eight pieces are

machined before discarding. Grinding was eliminated.

Outside diameter is rough turned with a style KFL-24 tool and boring is done with a style KFR-24 tool. Parallelogram inserts for these tools are interchangeable with these tools, thus permitting the use of four cutting edges, each of which are good for machining two pieces. A total of eight pieces are machined with each of these inserts also, four on each tool.

Finishing operations are done with parallelogram inserts and style KAR-24 tool. Since less strength of cutting material is required for finishing, the harder grade K4H inserts are used instead of K2S which was used for roughing cuts. Six pieces are finish machined per cutting edge for a total of 12 pieces with this tool and 24 pieces with each of the other finishing tools.

• • •

Specify KASSON Precision Collets and Attachments



3AT,
3C, 1A,
4C, 5C



480 (AC-50) PUSH
TYPE. All collets in
hexagon, square and
round for lathes,
milling machines, at-
tachments.



KLUTCH-KOLLET Step
collet. Accurate chuck-
ing to .24" dia. Soft
head for easy boring.
Lowest price on market!
Models 3AT, 3C, 5C.

FOR ATLAS • LOGAN • SOUTH BEND • CRAFTSMAN • SHELDON LATHES, ETC.

LEVER-TYPE
DRAWBAR
1/2" cap.

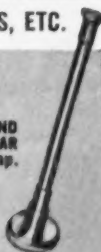


Positive grip on un-
dersize, oversize or
standard diameter
work. Patented co-
ordinate cams elimi-
nate fingers.

LIVE CENTER
(Ball Bear-
ing). Double
sealed for
accuracy.



HAND
DRAWBAR
1/2" cap.



Let us quote
on your
quantity
orders for
any types of
collets, live
center or
other ma-
chine tool
attach-
ments!

KASSON Precision
PRODUCTS

IMMEDIATE DELIVERY FROM STOCK

Guaranteed unconditionally. Distrib-
utors inquiries invited.

WRITE FOR FREE LITERATURE!

KASSON DIE AND MOTOR CORP.
32-14 Northern Blvd. • L. I. City 1, N. Y.

Use postpaid card. Circle No. 321

from the
BOARD

to the
**ASSEMBLY
LINE**

DPS *has*

the technical know-how
to "engineer" more speed
and profit into your
assembling operations.

● The signal success of DPS trained engineers in adapting power equipment to the individual feeding and assembling needs of industrial plants everywhere is assurance that they can likewise solve your special problems. In our broad line of

**SELECTIVE PARTS FEEDERS
POWER SCREWDRIVERS
SPECIAL ASSEMBLING MACHINES**



BOWL FEEDER

Electrical vibratory type
to feed parts that cannot
be tumbled.

equipment can be selected, and custom features incorporated, to fit your requirements. Plan now to use DPS modern assembling methods. Tell us your set-up. Write for catalog and further details.

**DETROIT
POWER
SCREWDRIVER CO.**

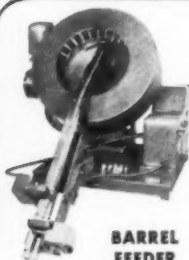
2809 W. FORT STREET • DETROIT 26, MICHIGAN

Use postpaid card. Circle No. 322



**POWER
SCREWDRIVERS**

An extensive, versatile
line in both bench and
pedestal types.



**BARREL
FEEDER**

Popular motorized type,
for parts requiring critical
selection.

Steady Billion Dollar Volume Seen for Machine Tool Industry

Raterman elected NMTBA president at annual meeting

An annual billion dollar base for shipments and new orders for the nation's machine tool industry was predicted by Louis Polk, president of the Sheffield Corporation, Dayton, Ohio, and president of the National Machine Tool Builders' Association, in an address before the Association's 55th Annual Meeting at the Edgewater Beach Hotel, Chicago, Ill., Nov. 7.

The meeting was attended by some 400 top executives of America's machine tool building companies, representing about 90% of the industry's capacity.

Jerome A. Raterman, President of the Monarch Machine Tool Company, Sidney, Ohio was elected President of the Association.

Alfred V. Bodine, President and Treasurer, the Bodine Corporation, Bridgeport, Connecticut, was elected First Vice President, and Ralph J. Kraut, President of the Giddings and Lewis Machine Tool Co., Fond du Lac, Wisconsin, was elected Second Vice President. Perrin G. March, III, President of the Cincinnati Shaper Company, Cincinnati, Ohio, was re-elected Treasurer. Walter K. Bailey, President



Jerome A. Raterman



Alfred V. Bodine



Ralph J. Kraut



Walter K. Bailey

of the Warner & Swasey Company, Cleveland, Ohio, was elected Secretary.

New Directors elected were Mr. Kraut, Mr. Bailey, and Edwin R. Smith, President and Treasurer of the Seneca Falls Machine Co., Seneca Falls, New York.

Ludlow King, Assistant Vice President of the Association, was elected Executive Vice President, succeeding Tell Berna, who has held that position for the last 20 years, and who is retiring from his connection with the Association on February 1, 1957. Mr.



Ludlow King



Tell Berna

Berna was honored at a dinner Nov. 8, attended by the board of directors and the past presidents of the Association.

Tool and Die Men Forecast Busy 1957

Contract tool and die plant owners attending the eleventh annual convention of the National Tool & Die Manufacturers Association at Hartford, Conn., Nov. 1-4 were almost unanimously convinced that the 1957 sales picture for their industry looks especially bright. They expected the volume of shipments of special tooling by their plants in 1956 to be "considerably higher than \$800 million," which would make that the all-time record year to date. Industry representatives from all parts of the country are looking forward to another good year in 1957. Most plant owners stressed the fact that since they have only small backlogs, their predictions could not with confidence be projected much beyond the early part of the New Year. Here are the high spots from key areas:

DETROIT—Tool and die plants, which have enjoyed an unusually busy year because of the major 1957 model changeovers by the automotive industry, anticipate an increase in orders next year. Many orders are already coming in for 1958 model retooling.

PHILADELPHIA—Also strongly affected by the auto industry, some plants

in this city expect to be engaged with 1958 tooling programs throughout 1957. One owner said he was "greatly optimistic" and that his force would be busy for at least six months. Most plants are now working overtime, averaging 50 hours a week.

NEW ENGLAND—Plants here also look for a busy 1957. Increasing tooling orders in connection with aircraft, missiles and other government projects will improve the situation, and one or more large tooling programs now being farmed out will make a major difference.

LOS ANGELES—Southern California tool and die men see a "very good year." A large influx of business is anticipated for right after the first of the year, most of it defense work—aircraft, missiles and electronics. Some plant owners report backlogs for the first time.

NEW YORK CITY—This center, which serves a wide range of production industries and is therefore a good yardstick, also looks forward to 1957 with confidence. One owner said he expects

his plant to be very active and added that others had told him they will have "all the business they can handle."

• • •

Murray Shields, senior partner in the economic consulting firm of MacKay-Shields Associates, predicted that the New Year "will probably be a period of expanded incomes and higher production with quite a lot of new highs in our economic statistics." He pointed

out, however, that "gains in production seem likely to be moderate rather than spectacular, with the year going down in our records as neither a period of rolling boom nor of rolling recession, but of rolling competition."

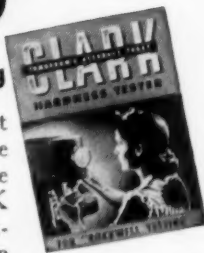
The economist estimated that the Federal Reserve index of industrial production will probably average out at about 145% of the level during the period 1947 to 1949, which would be an

GET THE FACTS

About Hardness Testing

Everything you need to know about hardness testing is told in this handsome book, prepared by the makers of the internationally respected CLARK Hardness Testers for "Rockwell Testing." Simple, easy-to-read text (in English) and numerous illustrations show the equipment and procedure for fast, accurate hardness testing of ferrous and non-ferrous materials. If you would like a copy, *free of charge*, just attach this ad to your letterhead or write "Send book." A copy will be mailed to you promptly.

P.S. If you are interested in descriptions and prices for CLARK Hardness Testers (Standard and Superficial) of *guaranteed accuracy*, say the word and we'll gladly supply them.



CLARK
HARDNESS TESTERS

CLARK INSTRUMENT INC.

10206 Ford Road • Dearborn, Mich., U.S.A.

Use postpaid card. Circle No. 323

all-time high and 2% above the average for 1956. The gross national product, he said, will probably be close to \$425 billion, up 4% from 1956.

Shields said that 1956 had been marked by a series of far-reaching internal economic readjustments which "may well have strengthened our economy against recession." Among these were the following: 1. Several major industries—automobiles, housing,

farm equipment and textiles—have already experienced recessions of considerable intensity; 2. The stock market as a whole has leveled out after years of boom; 3. The Federal Reserve authorities have steadfastly refused to use inflationary techniques in order to keep money artificially easy; 4. Agriculture has adjusted itself to lower income levels and a variety of influences including the soil bank program; 5. The

WORLD'S HARDEST METAL

● New, Improved TALIDE METAL is uniform in quality—gives top performance on ALL cutting, drawing and wear-resistant applications. Write for Catalog 56-G. METAL CARBIDES CORP., Youngstown 12, Ohio.

BLADES

ROLLS

TOOLS

DIES

BAR STOCK

METAL CARBIDES CORPORATION
TALIDE
 YOUNGSTOWN 12, OHIO

HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS
 HEAVY METAL • CERMETS • HIGH TEMPERATURE ALLOYS
 OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

Use postpaid card. Circle No. 324

Federal Government has held off from tax reduction. "Had the boom of 1955 continued throughout 1956," he pointed out, "our economy might now be ready for a serious internal readjustment."

* * *

Another convention speaker, Keen Johnson, former governor of Kentucky and vice-president of the Reynolds Metals Co., Louisville, told the tool and die manufacturers that "small busi-

ness is important" because it produces nearly half of America's business product.

Gov. Johnson said there are actually only 3300 corporations in the nation employing more than 1000 men, but there are three million companies employing fewer than 10 men. He paid tribute to the tool and die industry as an important factor in enabling the United States to turn out nearly half of the

how to trap dust

*that damages
your machines
and hurts
company morale*

Easy-to-move

TORIT

dust collectors trap dust
at its source!



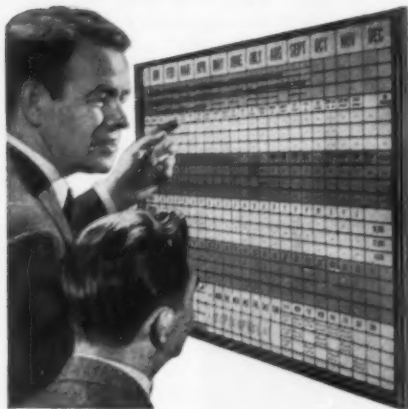
Untrapped dust costs money: "secretly" forces precision machines out of line, limits production. Torit dust collectors are unitized for custom installation—save more money, usually more efficient than central (built-into-building) system. Torit unit operates only when machine or combination of machines it protects are on. Filtered air may be returned to room to save heat. Many models and sizes, all self-contained, easy to move. Write today to . . .

TORIT

manufacturing co.

Dept. 601, 311 Walnut Street, St. Paul 2, Minn.

How To Get Things Done Better And Faster



BOARDMASTER VISUAL CONTROL

- ★ Gives Graphic Picture — Saves Time, Saves Money, Prevents Error
- ★ Simple to operate — Type or Write on Cards, Snap in Grooves
- ★ Ideal for Production, Traffic, Inventory, Scheduling, Sales, Etc.
- ★ Made of Metal Compact and Attractive. Over 60,000 in Use

Full price **\$49⁵⁰** with cards

FREE

24-PAGE BOOKLET NO. MB-20

Without Obligation

Write for Your Copy Today

GRAPHIC SYSTEMS

55 West 42nd St. • New York 36, N. Y.

Use postpaid card. Circle No. 326

world's products with only 6% of the world's population.

Harig made president NTDMA



Herbert Harig

Herbert Harig, president of Harig Mfg. Corp., Chicago, was elected president of the National Tool & Die Manufacturers Association for 1957. Philip R. Marsilius, vice-president of The

Producto Machine

Co., Bridgeport, Conn. was named first vice-president; Jack Kleinoder, secretary-treasurer of Volkert Stampings, Inc., Queens Village, N.Y., second vice-president; Robert C. Renner, president of the East Dayton Tool & Die Co., Dayton, O. was re-elected treasurer; and Harold G. Murdock, vice-president of Arrowsmith Tool & Die Corp., Los Angeles was re-elected secretary. George S. Eaton and Charles R. Bender continue as executive secretary and assistant executive secretary, respectively.

Sheffield demonstrates new grinder to defense production engineers

Precision performance of a new gear grinder developed by the Sheffield Corporation, Dayton, Ohio to help achieve higher volume output of extremely accurate gears powering modern weapons and aircraft and ordnance controls was demonstrated in a two-day series of evaluation tests conducted there recently for nearly 100 officials of some of the nation's leading producers of equipment for the armed forces, and military and government engineering and production specialists.

The demonstration, held by Sheffield engineers in cooperation with the Defense Department, put the company's

new Model 140 Reciprocating Gear Grinder through an exhaustive series of tests. The showing illustrated applications in production of automatic control mechanisms of fire control units, automotive transmissions, machine tool drives, aircraft missile and rocket accessory power units and timing and other devices.

The new grinder was shown to reduce many costly and slower pre-forming and finishing operations formerly necessary in producing precision gears.

New Name for Swanson Tool

Swanson-Erie Corp. is the new name of Swanson Tool & Machine Products, Inc., Erie, Pa. Only the name has been changed; there is no change in the company's organization, policies, services or products—special purpose machines and standard indexing machine chassis for automatic processing and assembly operations.

Cylinder company formed

The Hydair Cylinder Corp., 5755 S. Pennsylvania Ave., Cudahy 7, Wis., has been formed recently to produce air and hydraulic cylinders, boosters, accumulators and special cylinders.



Jack L. Modrich

For more than 15 years, President Jack Modrich has been a sales director in the cylinder field. He has been responsible for a number of design improvements in cylinders.

Expansion program under way

Marking the beginning of an expansion program designed to increase its machine tool production capacity an estimated 25 per cent, The Warner & Swasey Co., Cleveland, broke ground

**HIGHER SPEEDS!
FASTER GRINDING!**

kipp

AIR GRINDERS

MODEL JA
50,000 R.P.M.

\$42⁰⁰
IN U.S.A.



Weight 12 ounces;
length 6 1/4 inches;
chuck size 1/4 inch.
Wheel guard removed
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

kipp

MADISON-KIPP CORP.

207 Waubesa St., Madison 10, Wis., U.S.A.

Use postpaid card. Circle No. 327

recently for the first of two additions to its New Philadelphia (Ohio) plant.

The new building, to contain manufacturing and storage space totaling some 33,000 square feet, is expected to be ready for occupancy in April of this year.

According to Clayton D. Hatch, plant manager, the new facility will require the purchase of approximately 22 new machine tool units and, when com-

pleted, will add from 150 to 200 employees to the company's payroll. Construction of the second plant addition, to be used mainly for sheet metal work, will be started within a few weeks.

Prices rise 5-10%

Prices on several of its product lines have been increased 5 to 10 per cent, General Electric's Metallurgical Prod-



IN
PORTABLE
TOOLS

NEW BALANCED CUTTING ACTION **Severance** **ECARNO-MILLS**

THE ECONOMY MILL NEW DESIGN NEW CARBIDE

Make your money count! Replace more
H.S. Rotaries and Mounted Grinding Points.



SOLID
CARBIDE
CUTTING HEADS

22 Shapes and
Sizes Available



IN
MACHINE
TOOLS

A NEW
LOW PRICED
HIGH CLASS
PERFORMER



YOUR
SPECIAL
DEBURRING
PROBLEMS
ARE SOLICITED

Made by the originator of ground-from-the-solid Rotary Files, and pioneer in this type of Carbide Mill, who presently offer the largest range of standard types, shapes, and sizes.

OPERATE EFFICIENTLY AT USUAL CARBIDE
SPEEDS, YET PERFORM BEAUTIFULLY AT THE
SLOWER SPEEDS OF STEEL CUTTERS

PHONE, WIRE, OR WRITE US NOW
FOR PRICES

Severance TOOL INDUSTRIES INC.

722 Iowa Ave., Saginaw, Mich.

Ask for a Severance Catalog today!

Use postpaid card. Circle No. 328



CAN BE
REGROUND
REPEATEDLY

ucts Dept. reported recently. The increases reflect rising costs of labor and materials.

Products boosted 5 per cent include standard and special carbide blanks, standard tools and Hevimet alloy. The 10 per cent increase applies to mechanical tool holders, holder replacement parts and diamond wheel dressers.

Parker Stamp changes name

The Parker Stamp Works, Inc., Hartford, Conn., have changed their corporate name to avoid the confusion which has existed since the company began expanding into new fields of endeavor. The new name is "The Parker-Hartford Corporation."

**FROM THEN...
...TO ETERNITY**



The U. S. Drill Head Company's first Fixed Center Drill Head was produced for Borg and Beck, of Chicago — a subsidiary of Borg-Warner.

1957

The 50,000th Head was shipped.

*For men who know
drill heads best, it's
always U. S. Drill Head
...5 to 1*

Since 1915, when the U. S. Drill Head Co. built its first adjustable head, it has far surpassed all other similar manufacturers because of its engineering and production facilities.

*Manufacturers of all types of adjustable, fixed
center and individual lead screw tapping heads.*



THE UNITED STATES DRILL HEAD COMPANY

BURNS STREET • CINCINNATI 4, OHIO

Use postpaid card. Circle No. 329

Cutting tool company formed

Philip C. Satterthwaite, former vice-president and factory manager of Cogsdill Twist Drill Co., has organized and is president of Philip Tool Co.

The new company is manufacturing high speed steel metal cutting tools: reamers, end mills, counterbores, center reamers and countersinks.

Link-Belt buys Detroit Power Screwdriver

Link-Belt Co. has acquired Detroit Power Screwdriver Co., manufacturer of power-driven screwdrivers and related automated assembly equipment. The announcement was made by Robert C. Becherer, Link-Belt president and Roy W. Bailey, president of Detroit Power Screwdriver Co.



FOUR POSITION DRILLING & TAPPING TURRET HEAD

●
FITS ALMOST ANY
DRILL PRESS

No need to set up for each operation. A simple rotation of this turret head brings any of four drills or cutting tools into position. Speeds production—cuts cost! Specify size and make of drill press when ordering QUADRILL.

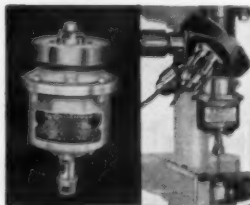
For Fast Accurate Tapping Operations use the **quadtapper**

You get precision tapping at high speed by simply attaching the QUADTAPPER to any of the four spindles of the QUADRILL. Write today for complete information on both these production tools.

CHICAGO QUADRILL

Company

1846 BUSSE HIGHWAY • DES PLAINES, ILL.



FOR USE ON QUADRILL ONLY

Use postpaid card. Circle No. 330

Screw machine products estimating clinics scheduled

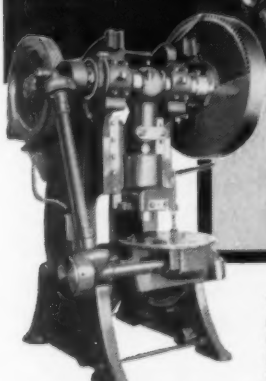
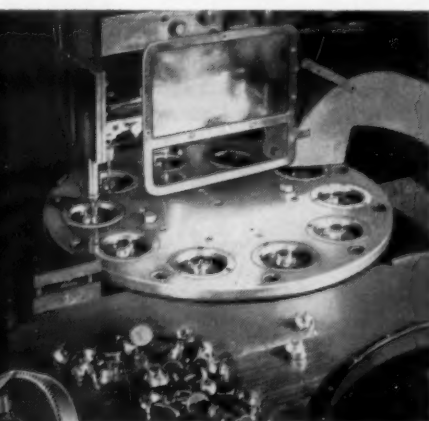
A series of screw machine products estimating clinics have been scheduled for presentation in all ten district groups of the National Screw Machine Products Association.

Open to both Association members and nonmembers, the one-day program will

include a comprehensive analysis of an estimate on a steel screw machine part sent in advance to all district members and selected nonmembers, that can be made on all types of screw machines.

Other topics to be covered will be weight estimating in brass, with analysis of causes of errors; blue print analysis; machine selection and selective estimating; and engineering and estimat-

**MODERN
FEDERAL
DIAL
FEEDS**
have what
it takes!



**VERSATILITY
plus
AUTOMATION**

What's the job? A standard operation—
or one that's unique to your plant? Modernize with Federal Dial Feeds and watch production go up, costs go down. Eliminate need for expensive equipment. Finest materials and workmanship. 6 to 80 tons. Automatic feeds and ejectors if desired.

No. 7 Dial Feed
Capacity, 80 tons

Write for new Dial Feed Catalog

THE FEDERAL PRESS COMPANY
710 Division Street, Elkhart, Indiana

FEDERAL DIAL FEED PRESSES

31 Years' Experience in Dial Feed Engineering and Construction

Use postpaid card. Circle No. 331

ing aids needed for an estimating department.

The first such clinic was held in Cleveland on December 4; others will follow in other NSMPA districts shortly thereafter. Additional information may be obtained from the Association at 2860 East 130th St., Cleveland 20, O.

Firth-Loach expands

The expansion program of Firth-Loach Metals, Inc., now nearing completion, will increase production capacity by more than 40 per cent. Among the new equipment are ball milling machines, a large capacity hydraulic press, new furnaces, and additional shaping equipment.

Sterling Die moves to larger plant

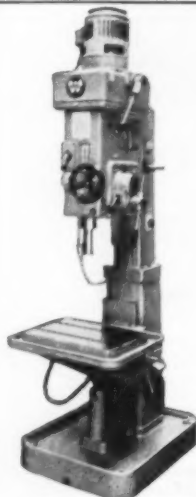
As part of an expansion program begun early last year, the Sterling Die

division of Pratt & Whitney Co., Inc., has completed its move to a new plant location in the southwest industrial park section of Cleveland that will more than treble its manufacturing facilities.

The new plant is located at 13811 Enterprise Avenue, and houses both the administrative offices as well as the production facilities.

N. Y. Twist Drill doubles plant size

A new plant that will double present manufacturing capacity is being erected by New York Twist Drill Co., Inc., on a site adjacent to its present building at Westbury, Long Island. According to Robert Hammer, president, the additional facilities should provide sufficient space for expansion for another five year period. Executive offices will remain in New York at 276 Lafayette St.



"WEBO"

**WORLD FAMOUS
UPRIGHT DRILLING
MACHINES**

CAPACITIES $\frac{3}{4}$ " to 2-7/16"

IDEAL FOR TOOL ROOM OR

GENERAL MACHINE SHOP.

AVAILABLE WITH SEMI-AUTOMATIC
TAPPING, COOLANT SYSTEM AND
WIDE RANGE OF SPINDLE SPEEDS.

WE SOLICIT YOUR INQUIRIES

DISTRIBUTORS IN UNITED STATES

CENTRAL & WESTERN STATES
JAMES W. GEORGE MACHINERY CO.
519 EAST JEFFERSON AVENUE
DETROIT 26, MICHIGAN

NEW ENGLAND & ATLANTIC STATES
TRANSMARES CORP.
15 WILLIAM STREET
NEW YORK 5, N.Y.

Underwood Corp. Wins Almco Award

The Underwood Corp., Hartford, Conn., manufacturer of business machines, is a grand prize winner of the Almco Supersheen Award for outstanding cost savings with Almco barrel finishing equipment, it has been announced. The award is one of several given each year by the Almco Div., Queen Stove Works, Inc. of Albert Lea, Minn.

Underwood reported a cost savings of \$.01783 per part, or \$6632 a year, on carriage end covers processed with Almco barrel finishing equipment. The award was a plaque plus a \$250 check.

In addition to dollar savings, the Underwood Corp. reported that the carriage covers finished with Almco equipment were more uniform and provided an ideal base for paint. Formerly, the company used a manual method of wheel deburring. This resulted in considerable labor costs and resulted in a high percent of rejects due to cuts through the thin wall of the covers.

Besides its grand prizes, the Almco Co. annually makes two awards of \$100 and two others of \$50 in each of two classifications: total dollar savings and percent of savings through the use of

O.D. Ladley, right, manager of the Almco eastern division, awards the \$250 prize check to J. P. Scavo of the Underwood standards engineering department.



Almco equipment. The grand prize winner in the total dollar saving division was the LeRoy Machine Co. of LeRoy, New York, a firm that saved \$124,000 annually with one Supersheen fixture barrel. This Almco equipment was used to debur compressor rotor dies for jet aircraft.

Ettco Tool expands, changes name

Ettco Tool Co., Brooklyn, N. Y., has changed its name to "Ettco Tool &

Machine Co., Inc." According to Melvin H. Emrick, president, the somewhat longer name is more descriptive of the full scope of lines now being manufactured.

In the past 12 months plant facilities have been doubled. This is part of a continuing expansion plan begun two years ago which included purchase of new automated machinery, new methods and training of an enlarged personnel.

Appointments and Promotions

Changes in Executive and Production Personnel

Name	Company	To	Position
Theodore J. Englund	Norton Company Worcester, Mass.	Same	Manager of Industrial Engineering
Paul L. Lantz	Norton Company Worcester, Mass.	Same	Asst. Mgr. Industrial Engineering
William F. Watts	Norton Company Worcester, Mass.	Same	Factory Manager, Refractories Div.
William P. Densmore	Norton Company Worcester, Mass.	Same	Chief Industrial Engr. Refractories Div.
Robert C. Lindberg	Firth-Loach Metals, Inc. McKeesport, Pa.	Same	Production Manager
H. R. Leber	Sundstrand Machine Tool Co. Rockford, Ill.	Sundstrand Michigan Corp.	Vice President
Douglas R. Starrett	L. S. Starrett Co. Athol, Mass.	Same	Exec. Vice President
Joseph L. Kano, Rear Admiral U.S.N., Retired	Johnson & Zitzewitz Chicago, Ill.	Kennametal Inc. Latrobe, Pa.	Vice President
R. E. Price	Gardner Machine Co. Beloit, Wis.	Landis Tool Co. Waynesboro, Pa.	Vice President, Asst. Gen. Mgr.
George F. Patterson	Brown & Sharpe Mfg. Co. Providence, R.I.	Same	Production Planning and Order Service Mgr. Machine Tool Div.
John Mourer	Landis Tool Co. Waynesboro, Pa.	Same	General Mgr.



R. C. Lindberg



D. R. Starrett



Joseph L. Kano



R. E. Price

Changes in Sales and Service Personnel

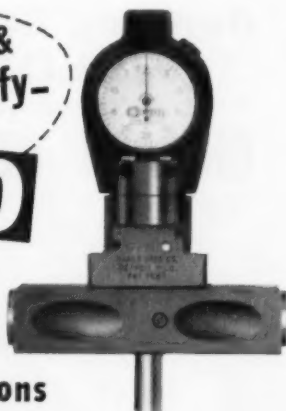
Name	Company	To	Position
Anthony J. Snyder	Morse Twist Drill & Machine Co. New Bedford, Mass.	Firth Sterling, Inc. Pittsburgh, Pa.	Assistant to Vice Pres., Sales
Clive C. Earle	Joseph T. Ryerson & Son, Inc. Buffalo, N.Y.	Joseph T. Ryerson & Son, Inc. Pittsburgh, Pa.	Manager, Alloy and Stainless Steel Sales
Frank W. Krohn	Norton Company Worcester, Mass.	Detroit District Office	Field Engineer
Frank T. Goll	C. A. Norgren Co. Englewood, Colo.	Same	Sales Manager
Gene R. Voigt	Arc Equipment Corp. Bryan, O.	Same	Sales Mgr., Air Tools Div.

more designers &
tool builders specify-

HANLO

**UNIVERSAL
GAGE UNITS**

for these **7** reasons



1. All parts of Hanlo Units are standard and replaceable.
2. All moving parts are fully enclosed, and well protected from dust and foreign matter.
3. Any impact from external or internal shock, is absorbed by the gage unit, and not the indicator.
4. The indicator is fully protected on all sides.
5. Indicator movement is restricted within one revolution, to insure against both injury and misreading.
6. Indicator can be rotated in movements of 45°, to permit easy reading on large gages, or in cramped areas.
7. Hanlo Units are never obsoleted by model or engineering changes—simply transfer the standard units.

TRACING TEMPLATES ARE AVAILABLE ON REQUEST

HANLO GAGE COMPANY

division of

JOHNSON DIE AND ENGINEERING CO.

16150 Hubbell Ave. • Detroit 35, Michigan



Clive C. Earle



Frank W. Krohn

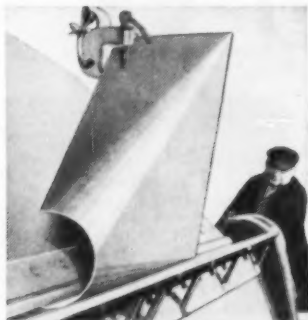


Frank T. Goll



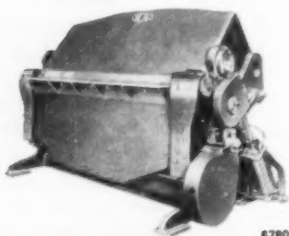
Gene R. Voigt

Bending Steel Plates for WELDMENTS? do it economically with **CHICAGO® BENDING BRAKE**



Many standard sizes are available with capacities for bending mild steel up to 12 feet by $\frac{3}{4}$ inch or 16 feet by $\frac{1}{2}$ inch.

The elimination of die costs and the ease of changing from one job to another make the CHICAGO bending brake the economical method for bending steel plates for weldments. An automatic stop regulating the degree of bend assures duplication on successive pieces.



6780

For details on how to do it, ask for Bulletin P-55



Press Brakes • Straight-Side-Type Presses • Press Brake Dies
Hand and Power Bending Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.

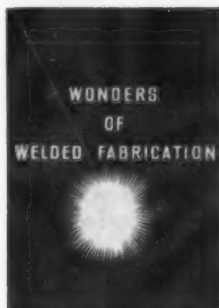
7440 South Loomis Boulevard, Chicago 36, Illinois

Use postpaid card. Circle No. 334

FREE LITERATURE

MACHINE AND TOOL

blue book



(See Number 1.)



(See Number 2.)



Spring Design & Selection...in brief



(See Number 4.)

1. Welded Fabrication. Booklet tells dramatic stories of modern steel plate fabrication. Welded fabrication is shown as indispensable to most basic industries. Acme Welding Div., 1072 New Britain Ave., West Hartford, Conn.

2. Flexible Hose and Tubing. Catalog G-560 provides helpful design suggestions for the planning of flexible metal connector applications. American Metal Hose Div., American Brass Co., 666 S. Main St., Waterbury, Conn.

3. "Heat Treating in Four Easy Steps" shows how Armor-Tuf steel hardening compound can be used to harden tools and steel parts by a simplified process. Armor-Tuf Sales Corp., 299 Madison Ave., New York, N.Y.

4. "Spring Design and Selection—in Brief" presents the fundamentals of spring design in sufficient detail to guide designer through the initial stages of a spring design problem. Associated Spring Corp., Bristol, Conn.

5. Solid Carbide Tools. This 100-page catalog contains many pages of new Atrax tools, like the miniature hole grinding burs, solid carbide routers—1544 series, and others. Atrax Co., Newington, Conn.

6. "Design for More and Better Products" describes the nature and scope of the diversified research and development programs conducted by American Machine & Foundry Co., AMF Building, 261 Madison Ave., New York 16, N.Y.

7. Wire and Strip Calculator makes it easy to determine the weight of springs made from given sizes of round wire and flat stock. Calculator is circular slide rule type. National-Standard Co., Niles, Mich.

8. Radial Draw Formers. Automatic high speed machines producing complex auto parts at rates of 400 to 800 parts per hour are illustrated in Bulletin AHS-956. The Cyril Bath Co., 32320 Aurora Rd., Solon, O.

9. Aluminum. Bulletin lists sizes and weights of rod, bar, sheet, coil, plate, tubular and building products of aluminum. Guide to selection also included. Joseph T. Ryerson & Son, Inc., Box 484, Jersey City 3, N.J.

To receive copies of literature described on these pages, simply encircle corresponding numbers on handy postage-free Action Cards opposite page 64 and elsewhere in this issue.

Free Literature

continued

10. Selector Chart. Calculator assists engraving machine users to find correct pantograph ration, proper width of cutter. Price \$1. H. P. Preis Engraving Machine Co., 223 Industrial Branch, Hillside, N.J.

11. Production Press. Catalog outlines features of a new kind of press for high production of progressive die stampings. Does not require a pit. Alpha Press & Machine, Inc., 9281 Freeland Ave., Detroit.

12. Punch Presses. Catalog presents a new line of punch presses having increased tonnage capacities. New oversize clutch. Benchmaster, 1835 W. Rosecrans Ave., Gardena, Calif.

13. Indicators, Gages. New price schedule applies to indicators and gages listed in No. 58 catalog. B. C. Ames Co., Waltham 54, Mass.

14. "Plaskon Resins for Shell Molding" describes shell molding process for casting metals. Emphasis on foundryman's problems. Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N.Y.

15. Taps, Drills and Gages are covered in catalogs containing pricing formulas for determining most economical quantities to buy. Beloit Tool Corp., 12000 Milwaukee Rd., Beloit, Wis.

16. Bore Gage. With its wide measuring range, repetitive accuracy, Compac bore gage makes the use of innumerable plug gages unnecessary. Borel & Dunner, Farmington Rd., Livonia, Mich.

17. Cobalt Drills, in fractional, wire gauge and letter sizes, including those with straight and taper shanks, are described in folder from Chicago-Latrobe, 411 W. Ontario St., Chicago 10, Ill.

18. Plant Story. "How DoAll Products are Made, Sold and Serviced" is a picture story of the DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.

19. Diamond Wheels and Tools. Catalog 717 announces the development of an expanded and improved series of resin and metal bonded diamond wheels. Delta Diamond Wheel Corp., 1403 Utica Ave., Brooklyn.

20. Automatic Tooling. Bulletin No. 500 describes Intermittor rotary and Trans-O-Mator in-line automatic assembly machine bases. Ferguson Machine Corp., Hicks Development Div., P.O. Box 350, Lebanon, Ind.

21. Lifting Equipment. Type DX Shop-lifter is available in capacities of 1000 or 2000 lb. Maximum crank handle pressure required, 25 lb. Economy Engineering Co., 4505 W. Lake St., Chicago 24, Ill.

22. Steel Benches, Drawers, and Cabinets are presented in Catalog No. 200. Benches are offered in four different tops—12 gauge steel, Masonite, resinwood, and laminated wood. Equipto, Aurora, Ill.



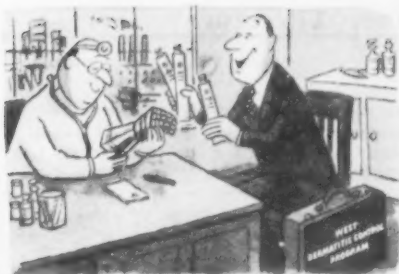
(See Number 14.)



(See Number 15.)



(See Number 19.)



"Doc! It's like fighting DERMATITIS with an armored glove."

Except WEST protective gloves are invisible:

- quickly applied
- comfortable to wear
- easily washed away.

For skin exposed to oils, dust, grease and grime:

- use PROTECTIVE CREAM #211.

For skin exposed to acids, alkalis and inorganic chemicals:

- use PROTECTIVE CREAM #311.

For skin exposed to organic solvents, acetates and cutting oils:

- use PROTECTIVE CREAM #411.

WEST PROTECTIVE CREAMS protect against hundreds of troublesome industrial irritants. They're antiseptic. Inhibit harmful bacteria with Hexachlorophene. And they protect for extended periods of time.

How Convair stops Dermatitis before it starts

A simple safety precaution is preventing dermatitis at the huge \$71,000,000 aircraft plant of Convair at Fort Worth, Texas. SAFETY ENGINEER S. A. GROSS (above) tells employees how to protect their hands against outbreaks of dermatitis with West Protective Cream #311. They cooperate - with their own well-being in mind. The result has been a reduction in the incidence of dermatitis to almost nil.

Would similar results interest you? Send the coupon.

LARGEST COMPANY OF ITS KIND IN THE WORLD



WEST DISINFECTING COMPANY, 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-23 Cosgrove Ave., Montreal

- ☐ Please send your 24 page booklet "The Control of Dermatitis in Industry."
- ☐ Please have a West representative telephone for an appointment.

Name.....

Position.....

Mail this coupon with your letterhead to Dept. 21



Free Literature

continued

23. "Small Magnets are so Versatile" introduces magnets as aids to all kinds of jobs. James Neill & Co. (Sheffield) Ltd., 37-39 Pearl St., New York 4, N.Y.

24. Leveling Jacks. Bulletin provides information on expanded line of machine leveling jacks—models, sizes and capacities. Enterprise Machine Parts Corp., 2731 Jerome, Detroit 12, Mich.

25. Small Tools and Accessories. Comprehensive catalog and price list covers cutters, cutter blanks, carbide end mills, and many other products. George Gorton Machine Co., Racine, Wis.

26. Saw Blades. Ohler triple-chip segmental saw blades are presented in well-illustrated brochure. Tongue of segment fits perfectly into groove of saw body. James W. George Machinery Co., 519 E. Jefferson Ave., Detroit 26, Mich.

27. Vibration and Noise Absorbing Mounts are described in Bulletin K2D. Mounts feature Elasto-Rib isolation material, universal dampers. Korfund Co., Inc., 48-39 W. 32nd Pl., Long Island City, N.Y.

28. Collet Closer (Blue Nose No. 456) uses No. 1 Hall collets. Capacity 1-1/16 rd., 7/8 hex., 3/4 sq. Provides for use of solid or ejector stops. Lloyd Tool Corp., 1620 N. Broadway, Burbank, Calif.

29. Clamping Unit. Folder introduces the Jig Nut, a time saving, cam-activated clamping unit that can be applied to any clamp stud or T-slot bolt. Morton Machine Works, P.O. Box 231, Millersburg, Pa.

30. Polishing, Grinding Wheels. "Modern Metal Finishing with 3M PG Wheels" covers actual wheel applications in metal-working industries. Minnesota Mining and Mfg. Co., 900 Fauquier St., St. Paul, Minn.

31. Multi-Cycle Lathe. A fully automatic cycle for every basic turning requirement is feature of the Model 21 Monamatic lathe. Bulletin No. 1808 available from Monarch Machine Tool Co., Sidney, Ohio.

32. "Barrel-Finishing with Norton Tumblex Abrasives" includes information on types of barrels, selection of abrasive, cleaners, time cycles. Norton Co., Worcester 6, Mass.

33. Notcher and Punch. Bulletin 79-D introduces Model 65-5 air power notching and punching machine and No. 5-24 hand lever punch and shear. Niagara Machine and Tool Works, 683 Northland Ave., Buffalo.

34. Carbide Tools. Catalog describes over 700 carbide and carbide tipped tools. Complete descriptions, specifications, and prices are given for each tool. Nelco Tool Co., Manchester, Conn.



(See Number 24.)



(See Number 25.)



(See Number 31.)

**INCREASES
PRODUCTION...**

LOWERS COSTS...

**PAYS FOR ITSELF
QUICKLY...**

The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven machine for handling light cuts in brass, aluminum, steel, plastics, and other materials—fast, accurately, and at very low cost. Only \$110.00*

Fixtures (illustrated) extra.

Motor equipment:—1/4 H.P. 110 Volt AC 60 cycle, single phase, swivel motor mount and light—\$36.00*

*All prices FOB Chicago.



- ★ **MILLS SMALL PARTS MUCH FASTER.**
- ★ **DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT.** Replaces expensive production machinery—or releases it for other jobs.
- ★ **INEXPERIENCED HELP CAN OPERATE IT.** Safe, simple, fool-proof operation.
- ★ **NO MORE COSTLY SET-UP TIME.** \$110.00* price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ **YOU GET A BETTER PRODUCT**—the result of ABSOLUTE ACCURACY.
- ★ **A LOSS BECOMES A PROFIT** when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- ★ **VERY LOW MAINTENANCE.**
- ★ **USED REGULARLY IN 1163 MANUFACTURING PLANTS** (some of which use as many as 30 machines)—yet on the market a scant few years.
- ★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of your production problems.

**Write today
for further
information.**

H. B. ROUSE & COMPANY

2214 N. WAYNE AVE., CHICAGO 14
50 YEARS OF SERVICE TO INDUSTRY

Use postpaid card. Circle No. 336

Free Literature

continued

35. Universal Vise from Willi Prewo, Germany, is presented in two catalog sheets. Whole vise pivots 360° on base plate, inclines 90° from horizontal to vertical position. Karl A. Neise, 404 Fourth Ave., New York 16, N.Y.

36. Electric Tools. Catalog 104 describes 69 portable electric tools and kits: saws, sanders, drills, planes, routers, shapers, combination tools, grinders. Porter-Cable Machine Co., 93 Exchange St., Syracuse 8, N.Y.

37. Precision Instrument Components are listed in Catalog No. 11, PIC Design Corp., Div. of Benrus Watch Co., Inc., 477 Atlantic Ave., East Rockaway, Long Island, N.Y.

38. Drill Bushings. Catalog introduces self-clinching template drill bushings, one-piece units of heat-treated steel which require only a single hole for mounting. Penn Engineering & Mfg. Co., Doylestown, Pa.

39. Circular Table, Walter, is available in six sizes, each size in two different types: Model 89/G for circular milling and for indexing in degrees; Model RT/T with an indexing attachment. Folder from Karl A. Neise, 404 Fourth Ave., New York 16, N.Y.

40. Graphic Visual Control. Boardmaster system pictures a company's operations at a glance, in step-by-step or period-by-period sequence. Booklet from Graphic Systems, Dept. MB-20, 55 W. 42nd St., New York 36, N.Y.

41. Drilling and Boring Machine. The UB-2 borer performs many general and specialized operations: drilling, milling, countersinking, tapping, etc. Folder from Olkon Research Corp., 630 Fifth Ave., New York 20, N.Y.

42. Precision Dial Caliper, accurate within .001", reading .001", is described and illustrated in flyer being distributed by Karl A. Neise, 404 Fourth Ave., New York.

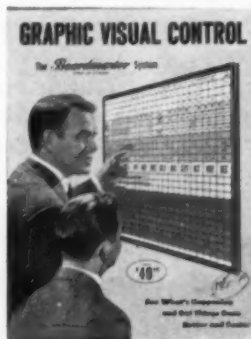
43. Crankshaft Grinding Wheels. Form ESA-263 includes information for multiple spindle setups for grinding main or line bearings. Simonds Abrasive Co., Tacony & Fraley St., Philadelphia 34, Pa.

44. Lubricants. Three bulletins—No. 48, describing a heavy-duty cutting oil; No. 50, announcing a new line of greases; No. 49, presetting two water-resistant extreme-pressure greases — are available from Sun Oil Co., Ltd., 85 Bloor St. East, Toronto 5, Ontario.

45. Compound Melters. Bulletin features Sta-Warm compound melting tanks, kettles, etc. Method applies electric heat to outer walls and bottom of melting unit. Sta-Warm Electric Co., Ravenna, O.



(See Number 38.)



(See Number 40.)

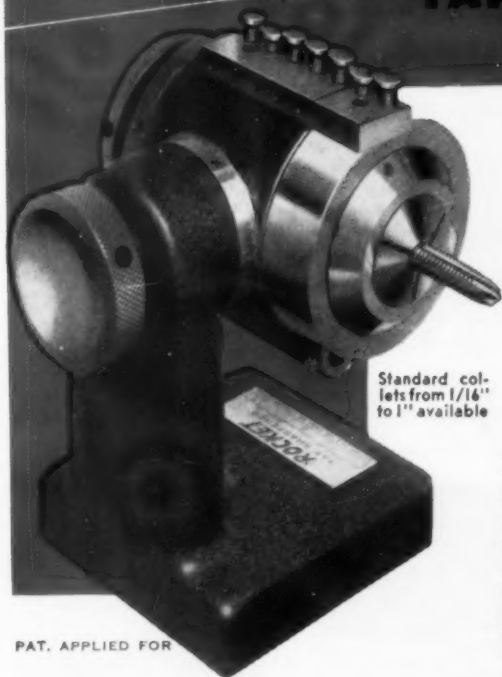


(See Number 43.)

sharpen dull taps swiftly, economically, and accurately

THE Rocket

TAP SHARPENER



Standard col-
lets from 1/16"
to 1" available



A low Cost
fixture that sharpens
dull taps to like new
condition

Don't dispose of dull taps! THE ROCKET
TAP SHARPENER can save you many
dollars in new tap investment — will
pay for itself in no time at all.

Designed to do a high precision job of
grinding 2, 3, or 4 flutes, right or left
hand taps, straight or spiral, the ROCKET
carries an unqualified company guaran-
tee of satisfaction. It can be used on
any make of tool and cutter grinder or
small tool room surface grinder. Simple
to operate — no maintenance.

Start reducing tap cost today — examine
the ROCKET TAP SHARPENER.

There's a ROCKET
sales representative
in your area. We
will be glad to
direct him to you
for a demonstration
of this unit. Litera-
ture is available
upon request.



ROCKFORD DIE & TOOL WORKS, INC.

1820 Seventeenth Ave. • Rockford, Illinois
Use postpaid card. Circle No. 337

January, 1957

191

Free Literature

continued

46. Dial Snap Gages. Booklet affords a basis for selecting dial snap gage best suited for a specific job. Standard Gage Co., Inc., Poughkeepsie, N.Y.

47. Hole-Location Gage. Bulletin explains the Center-Mike, an instrument that gives a direct reading of center distance between holes without knowledge of hole sizes. Sorensen Center-Mikes, Inc., 264 Kossuth St., Bridgeport 8, Conn.

48. "Tap Primer" gives basic information on taps, their uses and description. Simple terms help beginner understand the science of tapping. Threadwell Tap & Die Co., Greenfield, Mass.

49. Turret Attachments for small turrets, large turrets, lathes feature fingertip control which eliminates drag and jerkiness of turret and insures minimum tool breakage. E. F. Vilter Co., 4161 N. Richards St., Milwaukee 12, Wis.

50. Hydraulic Tracing Valve Model A-3D is subject of service manual giving detailed instructions which facilitate the proper installation of the tracer and allied equipment. True-Trace Corp., 9830 E. Rush St., El Monte, Calif.

51. Vise, Work-Holding Equipment catalog gives information on machine tool and angle vises, adjustable angle plates, adjustable, lathe fixtures, etc. Catalog 9156, Universal Vise & Tool Co., Parma, Mich.

52. Abrasive Saws book explains the various types of cut-off saws; portable combination cut-off and deburring chop; modular (capacity 5" pipe); swing type; rotating (12" pipe capacity). Wallace Supplies Mfg. Co., 1300 Diversey Pkwy., Chicago 14, Ill.

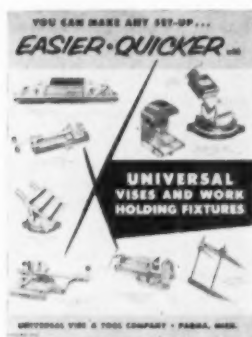
53. Wiring Products. Nail-Fast switch boxes supplied with 16d nails in place, gangable, non-gangable, and bracket switch boxes, and other products are covered in bulletin from H. E. Williams Products Co., Carthage, Mo.

54. Toggle Headers for double stroke heading of screws and rivets have production speeds of 100 to 150 blanks per minute. Circular No. 854-A-4 from the Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

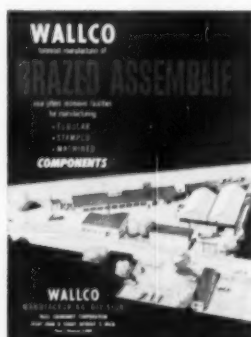
55. "Brazed Assemblies" describes the facilities and services provided by Wallco Mfg. Div.: design, development and manufacture of copper and silver brazed assemblies. Wall Colmonoy Corp., 19345 John R Street, Detroit 3, Mich.

56. Powdered Metal Press for producing parts of complicated shape. High production of parts of uniform density is achieved with simple tools. Bulletin 380, Watson-Stillman Press Div., Farrel-Birmingham Co., Inc., 301 Aldene Rd., Roselle, N.J.

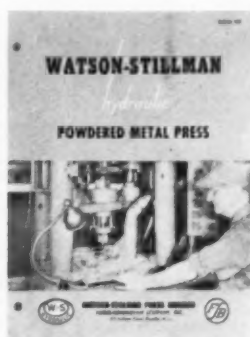
To receive copies of literature described on these pages, simply encircle corresponding numbers on handy postage-free Action Cards opposite page 64 and elsewhere in this issue.



(See Number 51.)



(See Number 55.)



(See Number 56.)

12

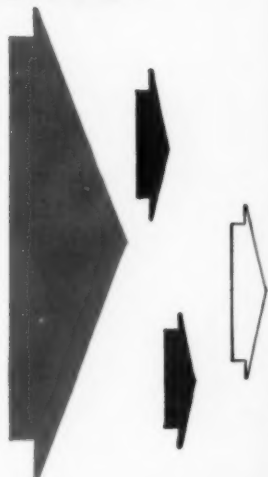
pages of facts

about the world's most complete line
of industrial drill presses for every
production and shop need!

ROCKWELL-BUILT

DELTA DRILL PRESSES

- Sizes from 20" to 14"
- 170 models
- over 150 accessories



DELTA 20" DRILL PRESS LINE

Delta's great new 20" Drill Press gives you machine tool capacity and ruggedness combined with power tool adaptability and versatility. It's designed to fill industry's growing need for flexible production tooling that can not only supplement, but often replace, heavier fixed machines costing four and five times as much.

DOES BIG MACHINE WORK—Full 6" spindle travel combined with long 5½' high column for extra spindle to table capacity enables you to handle many operations normally requiring heavy, immovable single-purpose machines. Yet the rugged new Delta 20" Drill Press offers the plus advantage of portability—move it where you want

DELTA 20" MODELS, SPECIFICATIONS

OVERALL DIMENSIONS: Bench: Height—54", Width—23", Front to rear—40"; Floor: Height—74", Width—22", Front to rear—37".

COLUMN: Dia.—3¾"

QUILL: Stroke—6", Dia.—2⅝"

CAPACITY: Cast Iron—1"; Steel—¾"

TABLE WORKING SURFACE: Production: 15" x 18"; Tilting: 16" x 18"

BASE WORKING SURFACE: Bench—18" x 24"; Floor—13½" x 14¼"

SPINDLE SPEEDS: With 1725 rpm motor—500, 800, 1200, 1800, 2600 rpm; With 1140 rpm motor—330, 520, 800, 1200, 1700 rpm

MOTORS: 1 hp single or 3-phase

SPINDLE FEEDS: Hand feed; Power feed—.004, .006, .009, .012, ipr



FLOOR MODEL

Equipped with production table (standard tilting table available as accessory); available with hand or power feed, No. 2 or No. 3 Morse Taper Spindle



Use postpaid card. Circle No. 338

...engineered for production tooling

it to reduce materials handling, save costly man hours.

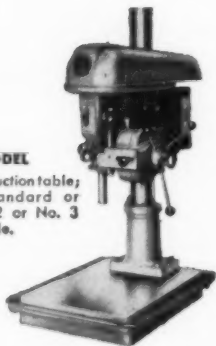
ADAPTS FOR SPECIAL SETUPS—New Delta 20" can be used singly or it can be used in combination with other machines to increase production, improve quality and cut costs on jobs throughout your shop. And Delta data sheets with

complete dimensions, make special setups fast and easy.

WIDE RANGE OF MODELS—28 models for wood-metalworking production work, tool rooms, maintenance departments: floor or bench; single or multiple spindle; No. 2 or No. 3 Morse Taper Spindle; hand or power feed.

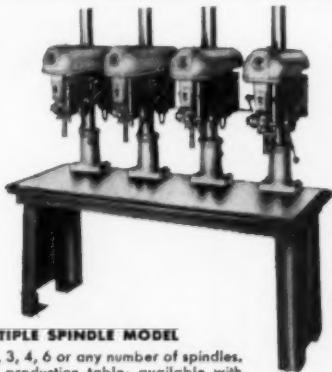
BENCH MODEL

Equipped with production table; available with standard or power feed, No. 2 or No. 3 Morse Taper Spindle.



MULTIPLE SPINDLE MODEL

Available in 2, 3, 4, 6 or any number of spindles. Supplied with production table; available with standard or power feed, No. 2 or No. 3 Morse Taper Spindle. Can be ordered as a unit, or as component parts enabling you to make your own setup with drill presses "a block long."



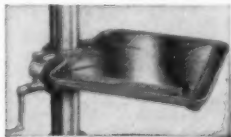
COMPARE THESE DELTA QUALITY PERFORMANCE FEATURES

Double row, pre-loaded heavy-duty ball bearing close to work load eliminates spindle play, assures lasting accuracy. Big $3\frac{3}{4}$ " dia. centrifugally cast iron column with $\frac{1}{2}$ " thick wall is precision ground to size to give rigid backbone, and extra weight for smooth,

efficient operation. Molded, reinforced fibre glass belt guard completely encloses belt and pulleys, swings out of way for fast speed changing—will not dent, crack or rattle like iron or steel. Quick set depth gage with magnified scale is easy to see, easy to read.



Full 6" Spindle Travel



Big 15" x 18" Production Table



Molded Fibre Glass Belt Guard

DELTA 17" DRILL PRESS LINE

This time-tested Delta 17" Drill Press has proved its ability to speed production and cut costs in hundreds of installations in thousands of manufacturing plants across the country. It's a big, rugged production tool that's built to stand up under continuous heavy duty operation, day after day, year in and year out,

with complete accuracy and little or no maintenance.

A REAL PRODUCTION TOOL—With the Delta 17" Drill Press you get all the speed, power and capacity you need to handle many jobs ordinarily demanding heavy, single-purpose tooling. On many jobs the Delta 17" Drill Press will not



FLOOR MODEL

Available with standard tilting table or production table, hand or power feed, high or slo speed, key chuck or No. 2 Morse Taper Spindle.

17" MODELS, SPECIFICATIONS

OVERALL DIMENSIONS: Bench: Height—47 $\frac{3}{4}$ ", Width—23 $\frac{1}{2}$ ", Front to rear—36 $\frac{1}{16}$ "; Floor: Height—67", Width—18", Front to rear—32"

COLUMN: Dia.—3 $\frac{1}{2}$ "

QUILL: Stroke—Std. feed, 5"; Power feed, 4 $\frac{1}{2}$ "; Dia.—2 $\frac{1}{4}$ "

CAPACITY: Cast Iron— $\frac{3}{4}$ "

TABLE WORKING SURFACE: Standard—10 $\frac{3}{4}$ " x 11 $\frac{3}{4}$ "; Production (floor model)—12 $\frac{1}{2}$ " x 17", (bench model)—16" x 18"

BASE WORKING SURFACE: Bench—16" x 18", Floor—10 $\frac{3}{4}$ " x 13 $\frac{3}{4}$ "

SPINDLE SPEEDS: With 1725 rpm motor: High Speed Models—700, 1150, 1750, 2750, 4250 rpm; Slo Speed Models—385, 600, 935, 1450, 2240 rpm

MOTORS: $\frac{1}{2}$, $\frac{3}{4}$ or 1 hp, single or 3-phase

SPINDLE FEEDS: Hand or power feed

another  product

...designed for heavy production

only outperform heavier machines but outproduce them, too!

LOW INITIAL COST—Delta, with its years of unmatched power tool manufacturing know-how and big sales volume, gives you more for your money. This lower cost means you get more production tooling for the same amount of

dollars that you would invest in just one single-purpose machine.

BUILT TO STAY ACCURATE—Rugged construction combined with precision engineering give the Delta 17" new machine accuracy that lasts. It holds extremely close tolerances even on the most exacting work, reduces costly rejects.



BENCH MODEL

Equipped with production table; available with hand or power feed, high or slow speed, key chuck Spindle, or No. 2 Morse Taper Spindle.

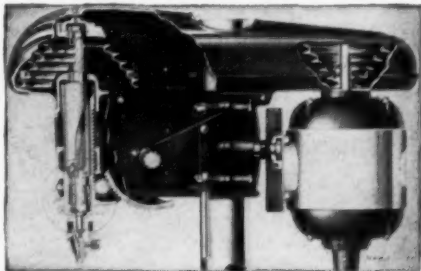


MULTIPLE SPINDLE MODELS

Available in 2, 3, 4, 5, 6, 8 or more spindles. Equipped with production table; available with standard or power feed, high or slow speed, key chuck or No. 2 Morse Taper Spindle. Can be ordered as a unit, or as component parts enabling you to make your own setup with any number of spindles.

CHECK THESE PRECISION-ENGINEERED FEATURES

Cutaway shows exceptionally rugged construction of the Delta 17". *Unique double spindle*—each mounted on two ball bearings plus short lower spindle design eliminates whipping, assures accuracy. *Wrap-around head design*—allows adjustment around quill to compensate for wear after long use. *Magnified depth scale*—can be set to read from zero when drill contacts work, gives clear, direct reading as drill penetrates.



DELTA 15" DRILL PRESS LINE

The all new Delta 15" Drill Press leads the way in today's trend toward the use of accurate, flexible power tools to supplement, and often replace costly custom tooling. It is the most versatile drill press in the world, yet it gives you the ruggedness and accuracy of heavier, far more expensive machines.

WORLD'S MOST COMPLETE LINE — With 40 models to choose from you can get the right model for your job: floor, bench, multiple spindle, standard or production table, high or slo speed, No. 2 Morse Taper or key chuck spindle.

NEW PRECISION, CONVENIENCE — No other 15" drill press offers so



15" MODELS, SPECIFICATIONS

OVERALL DIMENSIONS: Bench: Height— $37\frac{1}{2}$ ", Width— $13\frac{3}{4}$ ", Front to rear— $24\frac{1}{8}$ "; Floor: Height— $68\frac{1}{2}$ ", Width— $15\frac{1}{2}$ "*, Front to rear— $24\frac{1}{8}$ "; (*standard table; production table— $21\frac{1}{2}$ ")

COLUMN: Dia.— $2\frac{3}{4}$ "

QUILL: Stroke— $4\frac{5}{16}$ ", Dia.—2"

CAPACITY: Key chuck, $0\text{--}1\frac{1}{2}$ "; diameter of hole, Cast Iron— $\frac{1}{2}$ ", Steel— $\frac{3}{8}$ "

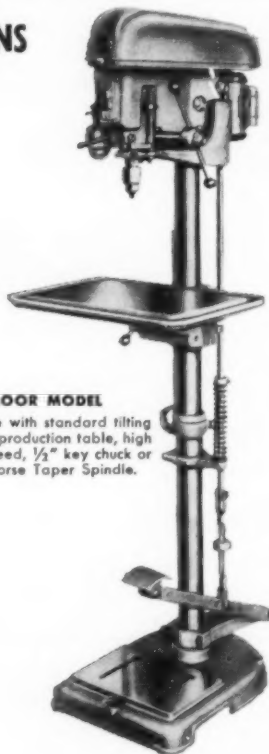
TABLE WORKING SURFACE: Production— $12'' \times 18''$, Standard— $10'' \times 10\frac{1}{2}''$

BASE WORKING SURFACE: Bench— $9'' \times 10''$, Floor— $8\frac{1}{2}'' \times 12''$

SPINDLE SPEEDS: With 1725 rpm motor: High Speed—680, 1250, 2400, 4150 rpm; Slo Speed—470, 780, 1300, 1950 rpm

MOTORS: $\frac{1}{3}$ or $\frac{1}{2}$ hp, single or 3-phase

SPINDLE FEEDS: Universal hand feed.



FLOOR MODEL

Available with standard tilting table or production table, high or slo speed, $\frac{1}{2}$ " key chuck or No. 2 Morse Taper Spindle.

another



product

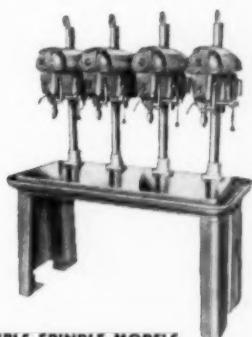
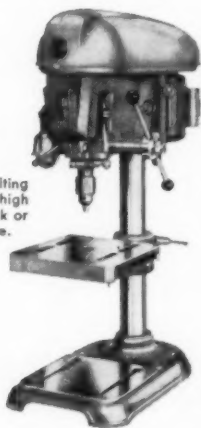
...for all-around shop or production work

many important features—features like the exclusive universal hand feed and swing-type belt guard illustrated and described below. And Delta also gives you a massive one-piece head—big 2" dia. quill—extra heavy pulley bearings—quick-set depth gage—self-locking depth stop—plus many, many more.

ALL AROUND VERSATILITY—Only Delta gives you a selection of six spindle adaptors for all production drilling jobs. Each is mounted on a ground taper for complete accuracy, with a threaded collar for positive locking. The Delta 15" is backed by the world's most complete line of accessories for countless other jobs.

BENCH MODEL

Available with standard tilting table or production table, high or slow speed, $\frac{1}{2}$ " key chuck or No. 2 Morse Taper Spindle.



MULTIPLE SPINDLE MODELS

Available in 2, 3, 4, 5, 6, 8 or more spindles. Equipped with production table; available with high or slow speed, $\frac{1}{2}$ " key chuck or No. 2 Morse Taper Spindle. Can be ordered as a unit, or as component parts enabling you to make your own setup with any number of spindles.

ONLY DELTA OFFERS OUTSTANDING FEATURES LIKE THESE

Only Delta combines the best features of pilot wheel and single lever feeds with an exclusive universal hand feed for adjustable leverage, freedom from

striking table or fixtures, almost infinite choice of feed lever positions. Belt guard fully encloses pulleys and belt, swings up for fast, safe speed changes.



Swing-Type Belt Guard



Exclusive Universal Hand Feed

DELTA 14" SUPER-HI SENSITIVE DRILL PRESS LINE

...for high speed small hole drilling

Delta's 14" Super-Hi Sensitive is specially engineered to meet the problems of small hole drilling.

LOWEST COST—No other tool gives the speeds, sensitivity, and precision at anywhere near the price!

PRECISION OPERATION—Dynamically balanced motor and counterbalanced quill assure fast, accurate

drilling with less drill breakage, less work spoilage. While recommended for all drillable materials, it is especially suitable for non-ferrous metals and phenolics.

REALLY PRACTICAL—Delta 14" Super-Hi Drill Press heads can be used on any standard 2 $\frac{3}{4}$ " dia. column, makes it unnecessary to buy extra columns, bases and tables.



14" SUPER-HI SENSITIVE MODELS, SPECIFICATIONS

OVERALL DIMENSIONS: Height—40", Width—12 $\frac{1}{4}$ ", Front to rear—23 $\frac{1}{2}$ "

COLUMN: Dia.—2 $\frac{3}{4}$ "

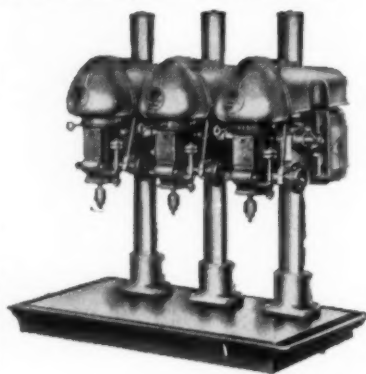
QUILL: Stroke—2 $\frac{1}{4}$ ", Dia.—1 $\frac{3}{4}$ "

CAPACITY: $\frac{1}{4}$ " down to #72 (.025)

TABLE WORKING SURFACE: 10 $\frac{3}{4}$ "x9"

SPINDLE SPEEDS: With 3450 rpm motor: Standard—12000, 8000, 5000 rpm (also available)—10000, 7000, 4500 rpm or 9000, 6200, 4000 rpm; With 2850 rpm motor: Standard—10000, 6600, 4100 rpm (also available)—8250, 5800, 3700 rpm or 7400, 5100, 3300 rpm

MOTORS: $\frac{1}{3}$ hp single or 3-phase



MULTIPLE SPINDLE MODELS

Equipped with production table and 0- $\frac{1}{4}$ " key chuck, available in 2, 3, 4 or any number of spindles.

another



product

SINGLE SPINDLE MODEL

Equipped with production table and 0- $\frac{1}{4}$ " key chuck.



DELTA 14" DRILL PRESS LINE

... accurate, economical utility tools

THIS NEW DELTA 14" UTILITY DRILL PRESS is designed to provide small commercial wood-metalworking shops and school shops with a rugged, accurate, inexpensive machine for a wide range of jobs.

SAVES MONEY—Proved precision and performance features mean more work with little waste, efficient operation at lowest cost.

DOES MANY JOBS—You get a selection of six interchangeable spindles: quickly converts to shape, rout, mortise, grind, ream, polish plus countless other jobs—eliminates the need for costly special tooling on many jobs.

LONG MACHINE LIFE—Solid Delta construction assures years of hard use with minimum maintenance.



14" MODELS, SPECIFICATIONS

OVERALL DIMENSIONS: Bench: Height— $37\frac{1}{2}$ ", Width— $13\frac{3}{8}$ ", Front to rear— $24\frac{1}{8}$ ";
Floor: Height— $68\frac{1}{2}$ ", Width— $15\frac{1}{2}$ "*, Front to rear— $24\frac{1}{8}$ " (*production table, available as accessory— $21\frac{1}{2}$ "")

COLUMN: Dia.— $2\frac{3}{4}$ "

QUILL: Stroke— $4\frac{5}{16}$ ", Dia.— $1\frac{3}{4}$ "

CAPACITY: Cast Iron— $\frac{1}{2}$ ", Steel— $\frac{3}{8}$ "

TABLE WORKING SURFACE: 10" x $10\frac{1}{2}$ ";
Production table (available as accessory)—
12" x 18"

BASE WORKING SURFACE: Bench—9" x 10";
Floor— $8\frac{1}{2}$ " x 12"

SPINDLE SPEEDS: With 1725 rpm motor:
High Speed—680, 1250, 2400, 4600 rpm;
Slo Speed—470, 780, 1300, 1950 rpm

MOTORS: $\frac{1}{3}$ or $\frac{1}{2}$ hp single or 3-phase

FLOOR MODEL

Equipped with standard tilting table (production table available as accessory); available with high or slo speed, $\frac{1}{2}$ " key chuck.



BENCH MODEL

Equipped with standard tilting table (production table available as accessory); available with high or slo speed, $\frac{1}{2}$ " key chuck.



DELTA DRILL PRESSES REPLACING—heavier thousands of plants

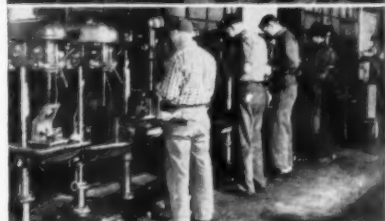
...in typical installations like these!

IDLE TIME TURNED INTO PRODUCTION TIME

The J. I. Case Company, Racine, Wis., mounted two Delta 17" Drill Press heads, columns and flanges on a broaching machine. Operator uses idle waiting time to drill and ream two locating holes in motor block pan rail while main bearing block is being broached.



\$24,000 SAVED ON LABOR COSTS—Cope-land Refrigeration Corp., Sidney, Ohio, saved \$24,000 the first year in direct labor cost when a production problem was solved through using a special Delta Drill Press setup that replaced a \$16,000 radial drill.

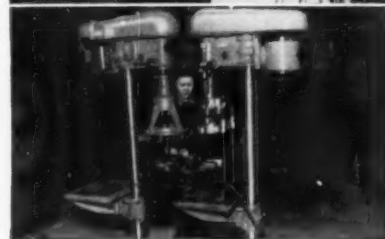


EVEN IDLE DRILL PRESSES SAVE TIME, MONEY

Binghamton Die & Machine Co., Binghamton, N.Y., found it much cheaper to install a Delta Drill Press on every diemaker's bench rather than move men, machines or materials. Even when idle, the Delta Drill Presses still increase profits.



\$7,500 SAVED ON INITIAL COST—A special application of two Delta 17" Drill Presses saved Lewyt Corp., Brooklyn, N.Y., \$7,500 in addition to fifteen months in waiting time for a much needed automatic drilling and threading machine.



are SUPPLEMENTING—or expensive machines in throughout the country

...for important reasons like these!

• MORE MACHINERY AT LESS COST

Delta Drill Presses cost far less than conventional machine tools—you get more production tooling for the same amount of dollars invested.

• READILY ADAPTABLE

With Delta Drill Presses you can fabricate machines to fit your needs, yet retain the advantage of using standard equipment.

• LOW MAINTENANCE COST

Delta's unmatched power tool know-how is behind the design, precision and ruggedness of every Delta Drill Press to assure lasting accuracy under punishing everyday operation.

• GREATER VERSATILITY

Delta Drill Presses are designed to handle all wood and metalworking drilling operations. And they're backed by the world's most complete line of accessories.

• EASY TO MOVE

Delta Drill Presses can be moved where you need them to reduce materials handling, break production bottlenecks.

• LOW OPERATING COST

Delta Drill Presses cost less to operate than complex special machines—they're low in HP requirements, keep power cost down.

• LESS FLOOR SPACE

You can put more Delta Drill Presses in a given area to increase output or reduce space required.

• SHORTER CYCLE TIME

Normally faster than machine tools, Delta Drill Presses can be used for short cycle operations in conjunction with machines that have long primary cycles, thus turning idle operator time into production time.

• EXPERT DEALER SERVICE

Delta Dealers, among America's finest industrial distributors, are fully trained power tool experts who can provide real help with your production problems.

• IMMEDIATE DELIVERY

Delta Dealers, conveniently located in key manufacturing areas throughout the country, carry complete Delta stocks. There's no lengthy lead time required for tooling, no costly down time waiting for repair or replacement parts.



...world's most complete power tool line

53 machines...246 models...over 1300 accessories

VISIT OR CALL YOUR DELTA DEALER...

(he's listed under "TOOLS" in the Yellow Pages of your phone book)

SEE DELTA DRILL PRESSES

demonstrated—compare for **PRECISION**—for
QUALITY—for **VALUE**—then make up your OWN mind!

SEND

coupon for dealer's name and complete
catalog specifications

Delta Power Tool Division, Rockwell Manufacturing Co.
610A N. Lexington Ave., Pittsburgh 8, Pa.

Please send the following:

Individual Delta Data Sheets with
dimensions for:

- ☐ New Delta 20"
- ☐ Delta 17"
- ☐ New Delta 15"
- ☐ Delta 14" Super-Hi Sensitive

- ☐ Complete catalog on entire Delta Power Tool line.
- ☐ Booklet: "Teaming Delta Power Tools with Machine Tools."
- ☐ Special reprint of this handy reference Delta Drill Press Insert.
- ☐ Names of Delta Dealers nearest me.

Name _____ Title _____

Company _____

Address _____

City _____ County _____ State _____



another product by
ROCKWELL



BOOK REVIEWS

1957 VERIFIED DIRECTORY OF MANUFACTURERS' REPRESENTATIVES, 8½ x 11 inches, 195 pages, *Manufacturers' Agent Publishing Co., 505 Fifth Ave., New York 17, N.Y. \$20.00.*

The Directory lists 14,500 manufacturers' domestic and export representatives in the United States, its Territories (Alaska, Hawaii, Puerto Rico and Virgin Islands) and Canada. The listings are arranged geographically and include the principal products each "rep" carries and the trading area covered.

As an additional guide to sales executives, the publication suggests commission scales for various products, typical clauses to include in a manufacturer-manufacturer's representative contract and an appraisal of a "rep's" importance to a manufacturer.

TRANSISTOR ENGINEERING REFERENCE HANDBOOK by H. E. Marrows, *Catalog No. 193, 9 x 12 inches, 288 pages, cloth-bound. John F. Rider, 116 W. 14th St., New York 11, N. Y. \$9.95.*

This handbook presents the unbridged details on some 200 different types of transistors. In addition to the constant and characteristic curves, all of the performance data is on types already available. This is not a theory book.

Among the components designed for transistorized equipments presented in this book are almost 200 transformers, 450 capacitors, more than 100 cells and batteries, a selection of thermistors and a variety of miscellaneous components.

The engineer and engineering student who is just beginning to look into the details of transistor circuits will find the general transistor story to be compact and right to the point, with a selected bibliography to guide him in almost any direction he chooses to take.

DEPARTMENT OF DEFENSE DIRECTORY OF METALWORKING MACHINERY, 1956 Edition. *Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. \$6.25.*

The Directory will provide product listings of all machine tool manufacturers whose items are owned by the Department of Defense, or manufacturers who have made known to the Department of Defense before November 1955, the availability of new products.

The unique feature of this book is the Production Equipment Code number (formerly Standard Commodity Code) which accompanies the description of each machine listed.

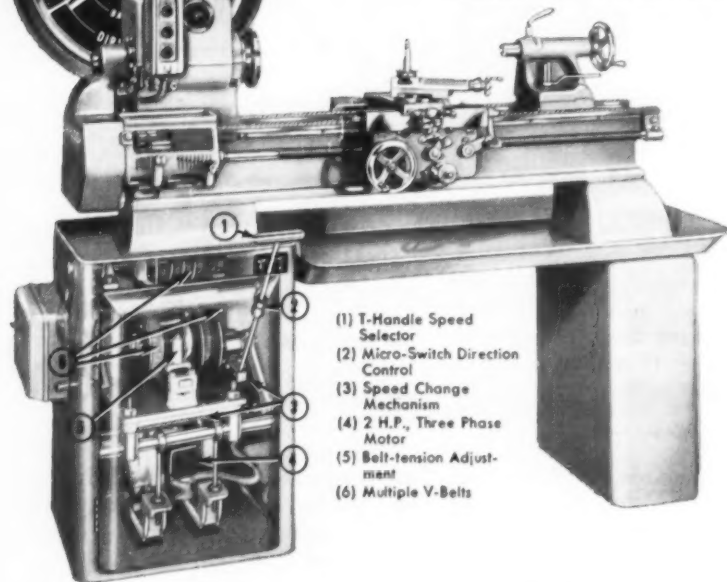
The primary function served by this book is better management of all machine tools owned by the Department of Defense. The Production Equipment Code number contained therein, is especially adaptable to electrical accounting machine tabulations and is used extensively in collection, transmission, correlation and review of machine tool data. By promotion of common terminology, since publication of the first edition in 1945, this book has contributed to better understanding between government and industry.

SHELDON *Variable Speed* PRECISION LATHES



...any speed INSTANTLY *

* Spindle speeds changed at 100 r.p.m. per second. Built-in tachometer permits accurate selection of speeds from 200 to 1800 r.p.m. in direct drive—40 to 300 r.p.m. in back gear.



- (1) T-Handle Speed Selector
- (2) Micro-Switch Direction Control
- (3) Speed Change Mechanism
- (4) 2 H.P., Three Phase Motor
- (5) Belt-tension Adjustment
- (6) Multiple V-Belts

This new lathe instantly meets every changing speed requirement in the tool room, or quickly sets and holds to any prescribed speed for production runs.

Rugged, Heavy-duty Variable Speed Drive—an oversized unit with double V-belts throughout that delivers positive full-power to the spindle.

High Spindle Speeds—from 200 r.p.m. to 1800 r.p.m. (direct drive), from 40 r.p.m. to 300 r.p.m. in back gear.

Instant and Automatic (power driven) Speed Selection—Only 9 seconds to change from low to high speeds in either direct drive or backgear. Speeds are changed automatically when T-handle is lifted or pushed into engagement.

High Horsepower at All Speeds—Because the drive unit is oversized, it has larger belts which deliver maximum gripping power at all speeds. A 2 H.P., three Phase motor recommended.

Additional lathe features: Zero Precision tapered roller spindle bearings, 54 pitch gear box, heavy cast pedestal, tool-room accuracy. Optional accessories include hardened bed ways, L00 long taper key drive or 4" D1 Camlock spindles.

Sheldon Precision Variable Speed Drive Lathes are available in 11" or 13" Swing. Model WM-56-P (Illustrated) less motor and switch, \$1,944.00 F.O.B. Chicago. Other 10", 11", and 13" Sheldon Precision Lathes from \$832.00 up. Also 13" and 15" Sebastian Geared Head Lathes, Sheldon Milling Machines and Sheldon Shapers.

Write for Catalog

SHELDON MACHINE CO. INC. 4242 N. KNOX AVE. CHICAGO 41, ILL.

Use postpaid card. Circle No. 344

WHAT'S NEW IN METALWORKING

MACHINE AND TOOL

blue book

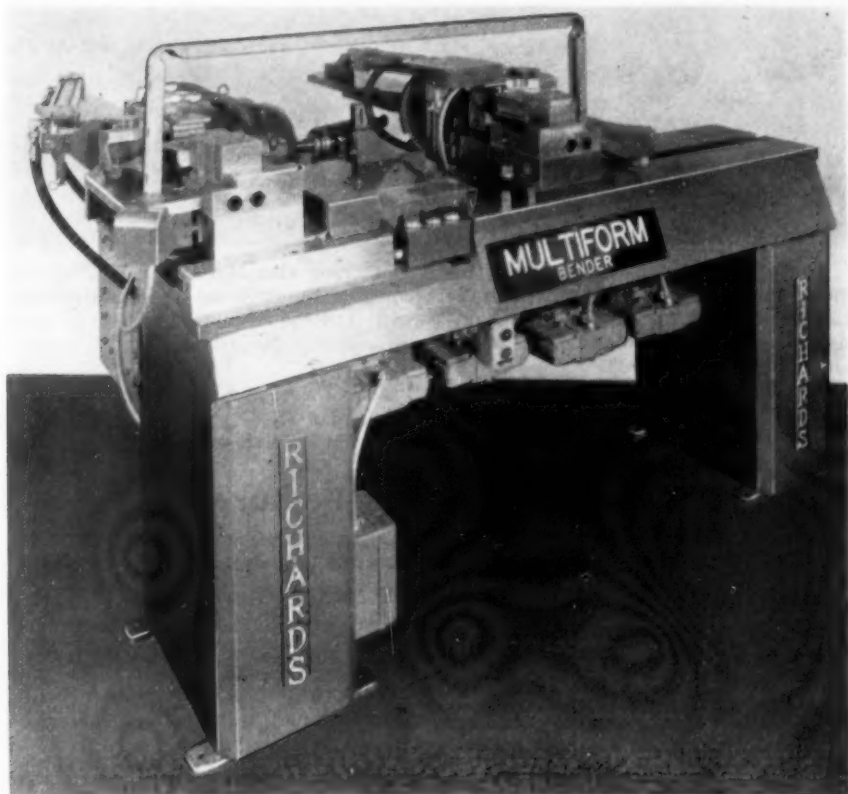
Edited by **D. M. Carlson**

Hydraulic Double End Bender

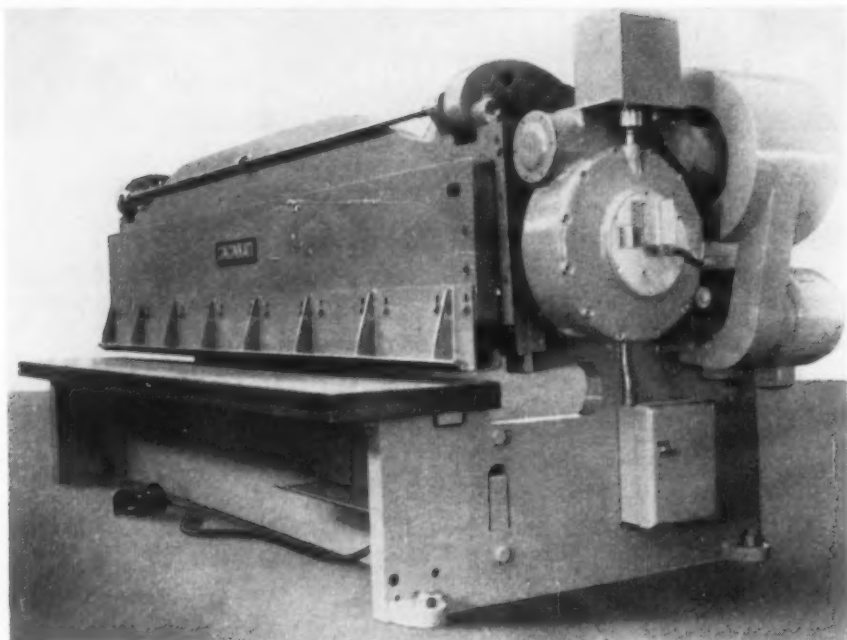
The Multiform Big Brother hydraulic double end bending machine produces multi-angled channels in widths from two to six feet, adjustable. Operated by

ten hp motor. Automatic production cycle, 15 seconds. Push button controls. J. A. Richards Co., Dept. JS, 903 N. Pitcher St., Kalamazoo, Mich.

Use postpaid card. Circle No. 81



Shear Cuts Steel Road Mesh



The 4314 Series all-steel shear cuts steel road mesh of the type used to reinforce concrete roadways. No hold-downs are required to hold the material while the cut is being made. An adjustable material guide is provided, however, to prevent the material from "tipping up" during the cut.

Machine also features electric clutch control. It may be set up in conjunction with automatic material-feeding units to minimize manual handling.

The Cincinnati Shaper Co., Dept. HS, Cincinnati 25, O.

Use postpaid card, Circle No. 82

Lapping Machine has New Features

Two newly redesigned and one additional feature have been incorporated in the Model 72 Lapmaster lapping machine. The spider bar and roller bar attachments have been improved. An ammeter has been added as standard equipment.

The spider bar is now a two stanchion setup and is ribbed on the underside to withstand all pressure the pneumatic cylinder can produce. This prevents

binding in the guide ways when the pressure plate and conditioning rings are lifted.

Two adjustable supports have been added to the roller bar. These keep the roller bar on even plane so that it can be conveniently stacked with parts during loading or unloading of the machine.

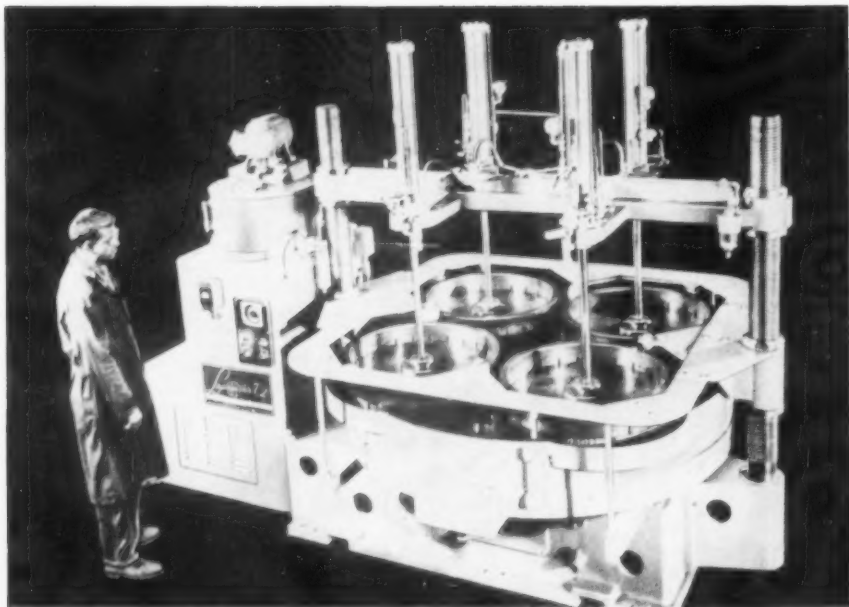
The ammeter warns the operator



12 PERFECT FILES IN EVERY DOZEN • 12 PERFECT FILES IN
EVERY DOZEN • 12 PERFECT FILES IN EVERY DOZEN • 12
PERFECT FILES IN EVERY DOZEN • 12 PERFECT FILES IN
EVERY DOZEN • 12 PERFECT FILES IN EVERY DOZEN • 12
PERFECT FILES IN EVERY DOZEN • 12 PERFECT FILES IN



NICHOLSON FILES



when the machine is being overloaded. It also indicates how much pressure can be added from the pneumatic lift assembly and shows whether or not the solenoids are operating properly.

Machine's capacity ranges from four 27" dia. parts up to 2480 1" dia. parts

per load. It is capable of generating surface flatness to less than one light band and finishes to 2 rms in short or high production runs. Crane Packing Co., Dept. MEW, 6400 Oakton St., Morton Grove, Ill.

Use postpaid card. Circle No. 83

Pratt & Whitney Ships Huge Keller

One of the largest Keller automatic tracer-controlled milling machines manufactured and assembled by Pratt & Whitney Co., has been shipped to the Douglas Aircraft Co. in Santa Monica, Calif.

The 73 ton giant will be used to mill forgings for jet-powered aircraft.

Horizontal travel is 14 feet and vertical travel seven feet. It is a single spindle model, Type BG-22.

The machine's fixture is of weldment construction to meet rigidity requirements caused by increased horsepower and a considerable increase in speeds

and feeds. Weighing approximately 60,000 lb., it was fabricated by Avery & Saul, Cambridge, Mass. It consists of two lower sections bolted together, each 7' wide x 9'8" high and 4'6" deep. The upper fixture bodies consist of two separate sections, each 7' wide, for mounting the model, and can be adjusted transversely by rack and pinion. A spacer is located between upper and lower fixture bodies to permit this transverse adjustment and is also used to tie the fixture to the column. This tie consists of a support bracket and an adjustable arm with slider, all of

JUST ONE *SYNTRON* VIBRATING PARTS FEEDER



Yes—just one Syntron Vibrating Parts Feeder can take over the fatiguing, tedious, time consuming task of handling a small part, hundreds of parts per hour—and release many hands for more important work.

There are no mirrors to manipulate—nothing to hide up a sleeve. VIBRATION does the trick. 3600 gentle, electro-magnetic vibrations per minute move the parts up and around the bowl, orienting and positioning them as they go. Thus when they reach the bowl discharge, they're positioned as you want them in your processing or assembly system.

But, that's not all. Syntron can now furnish you with Gravity Feed Tracks to transport the oriented part from the bowl discharge and deposit them in a position where they can be picked up by your work loading device, fixture, die, etc. Either solenoid or air cylinder operated escapement mechanisms release the parts from the Gravity Feed Track upon proper signal from your processing operation. Syntron Vibrating Parts Feeders are available in seven different sizes, capable of handling a size range of parts from a 1mm ball to a 12" cylinder head bolt.

They operate on 110 volt or 220 volt or 440 volt, 60 cycle a-c.

Every application that converts a monotonous manual task into an automatic operation will save you money. We can help you save money.



SYNTRON COMPANY
300 Lexington Ave. Homer City, Pa.

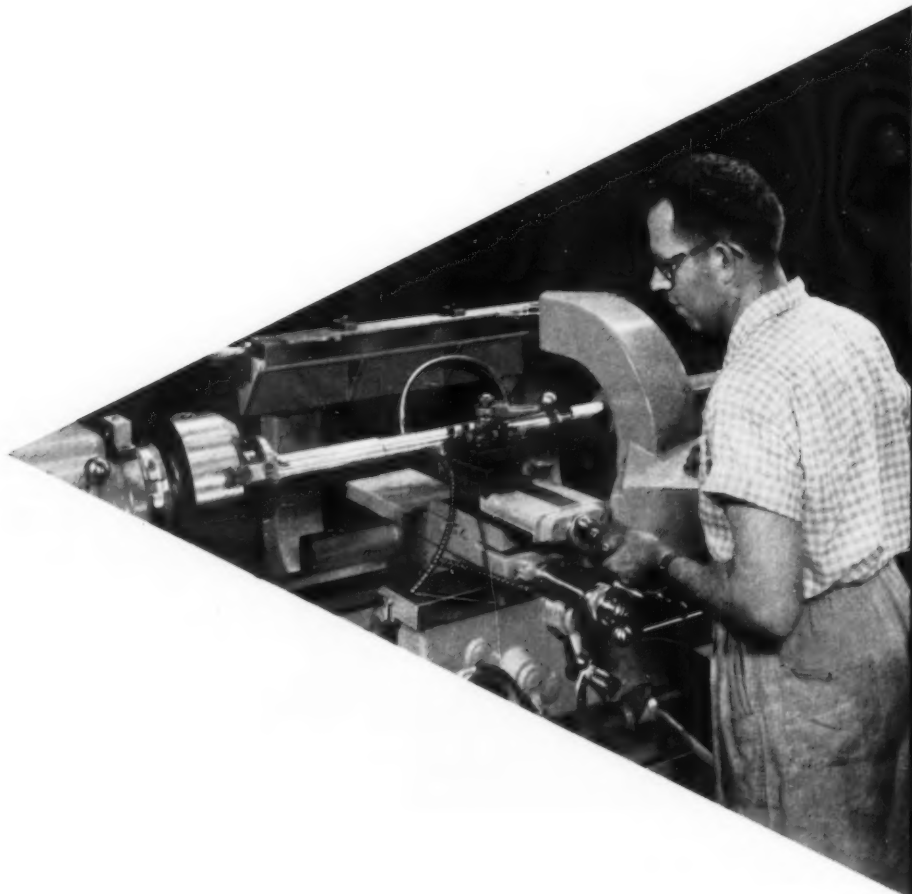
Use postpaid card. Circle No. 346

**Write for complete
catalogue data—FREE**

the New Rockford Tracer Lathe . . .

with hydraulic

KOPY



- KAT DUPLICATOR

check these

PLUS FEATURES

Duplicating Attachment and Lathe built by same manufacturer. No Divided Responsibility.

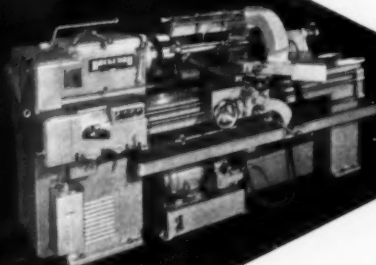
Kopy-Kat Valve precision manufactured with built-in retract.

Power Unit requires no added floor space.

Push Button Station combines and interlocks machine and electrical controls.

European Tool Post.

Automatic Feed Cut-Out.



**MEDIUM-SIZED
ECONOMY-PRICED**

... is the greatest value ever offered in a tracer lathe. Forty years of building fine lathes and 25 years of hydraulic duplicating experience make an unequalled combination. Extreme accuracy of duplication, coupled with enough ruggedness to utilize the full horsepower of the machine, make Rockford Tracer lathes the preference for repetitive turning in any volume.

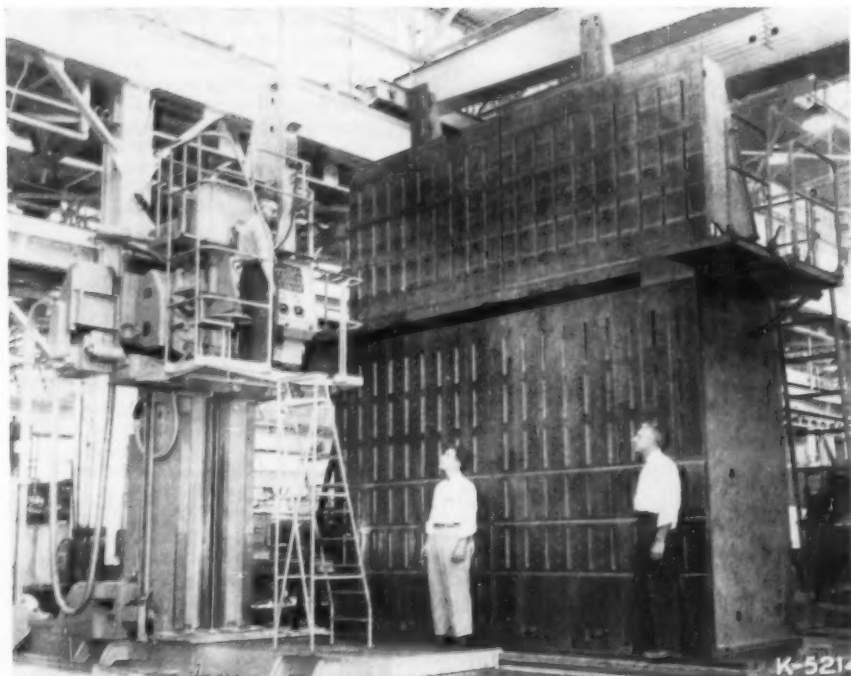
The Rockford Tracer lathe can be converted to a completely standard engine lathe in a matter of minutes, thus adding to its versatility and flexibility for small lot production.

Complete interchangeability of multiple diameter work can be achieved by unskilled operators at production speeds comparable to turret lathes. These machines are rugged enough for heavy production work, yet flexible enough for tool room or job shop production.

Ask for bulletin No. 1002, or send us prints of your applications for free production estimate.

ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS



which is fastened to the moving column.

The slider moves in a groove provided in the fixture spacer between the upper and lower fixture bodies. This effectively ties machine to fixture during travel and has materially increased the machine's ability for heavy cutting.

The width of the fixture is 14 feet and it stands 16 feet high above the

machine table. The front plate of the lower fixture is 3" thick and all of the vertical slots were cut by torch and required no further machining.

The Keller, complete with fixture, has a total weight of approximately 146,000 lb. Disassembled, it required four 50 ft. boxcars for shipment.

Use postpaid card, Circle No. 84

Special Machine Assembles Rolling Hangers

This machine assembles semi-automatically the rolling hangers for sliding doors and screens. There are three different styles of hangers, the assembly consisting of bracket, shoulder rivet, bronze bushing and nylon roller. Three feeding devices, two shown in the illustration and one hidden, feed the rivet, bushing and roller. The roller is fed from a vibratory feeder into an



indexing dial. The bushing is fed from

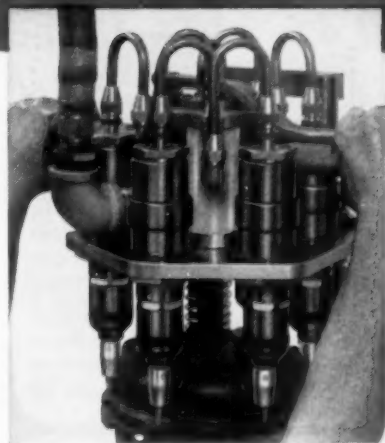


he **HAD**
to use a
hand wrench!

but **YOU** can use a Buckeye Air Tool!

This Buckeye Tools multiple-unit fastening tool runs down six hex head bolts simultaneously. It could be designed to handle more bolts, different sizes of bolts, or to run them down at different levels at the same time. Or, it could run down bolts at various angles, even straight up!

This is just one of many new Buckeye fastening tools. Are you sure you're doing your fastening work the modern way? Our Catalog A-10 will help you decide—and it's yours for the asking.



Why AIR Tools?

Because air is everywhere, just waiting to be put to work . . . because continuous operation can't possibly harm an air tool . . . and because, using Buckeye air tools, you can almost forget about tool maintenance.

In Air Tools,
Your Best Buy Is Buckeye

Buckeye Tools
CORPORATION

DIVISION 14 • DAYTON 1, OHIO

Use postpaid card. Circle No. 405

How to find a
perfect mate!

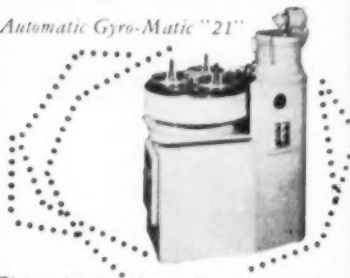
SPITFIRE

"Nth degree" LAPPING MACHINES

Valve components, mechanical seals, many other parts require perfect mates... possible by producing surfaces of precision flatness and finish. This quality control is "built-in" around the world... with Spitfire Machines.

whatever your lapping requirements... SPITFIRE offers the proved answer:

Automatic Gyro-Matic "21"



Three basic elements: the human, mechanical and economical... are combined in the Gyro-Matic "21". Simple operation means any production worker can produce precision lapped parts. Micro-inch lapping to .0000116" flatness is standard. Rapid push-button control minimizes man-hours. Where critical parts are standard... so is the Spitfire Gyro-Matic "21".

*Get full details...
mail this coupon today!*

SPITFIRE TOOL CO., Dept. BB
2931 N. Pulaski Rd., Chicago 41, Ill.

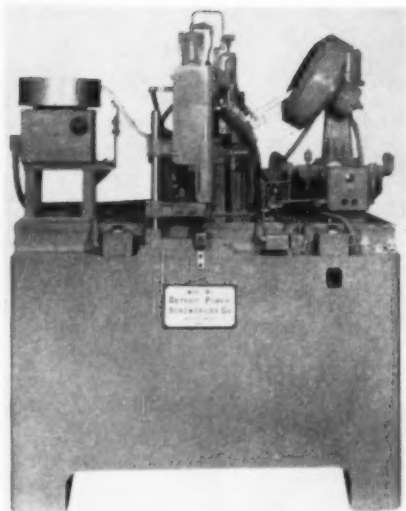
Name _____

Firm _____

Address _____

City _____ Zone _____ State _____

Use postpaid card. Circle No. 349



another vibratory feeder and pressed into the nylon roller. At the next index the shoulder is fed by means of a barrel or rotary feeder and inserted into the pre-assembled roller and bushing.

The complete assembly is then ejected into a track twisted 180 degrees, which feeds it into a locating fixture. The operator then places the steel bracket over locating pins in the fixture and touches two palm switches which, in turn, cycle the pneumatic-operated impact hammer. At the point of assembly, the hollow body of the shoulder rivet is flared. Detroit Power Screwdriver Co., 2801 W. Fort St., Detroit 16, Mich.

Use postpaid card. Circle No. 85

**Nibbler for cutting
corrugated metal**

This portable nibbler cuts corrugated sheet metal and small diameter duct or sheet metal pipe without distorting, curling, or flattening of the corrugated curves on either side of the cut.

Nose piece and die holder set at right angles to the body permits ease in



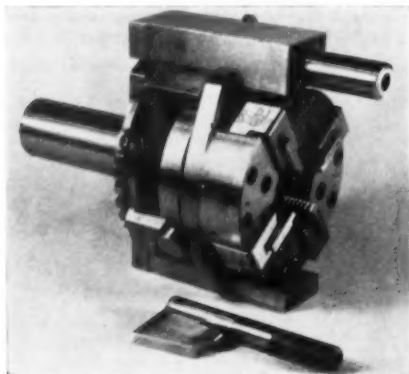
handling. Diagonal cuts across the curves can be made and circles as small as two inches in diameter can be cut without damaging the corrugated metal.

Nibbler weighs $7\frac{1}{2}$ lb., measures 10 inches over-all. It has a $\frac{1}{2}$ hp high speed motor, ball bearing, and operates from 110 volt ac/dc current single phase with 33 inches of cutting per minute, 16 gauge metal. Fenway Machine Co., Dept. RS, Edgemont and Clementine St., Philadelphia 34, Pa.

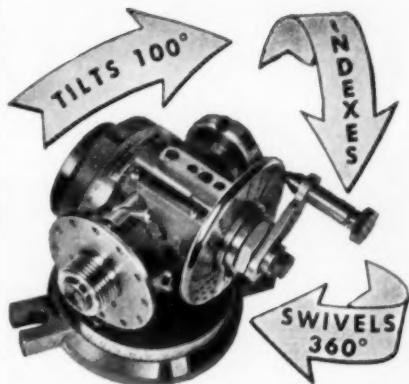
Use postpaid card. Circle No. 86

Insert chaser die head

The new style DMRT H & G insert chaser die head, for use on the No. 2 Brown and Sharpe automatic screw machine, will cut straight threads, regular taper threads or reverse taper threads



January, 1957



FOR FASTER PRODUCTION

THE ELLIS DIVIDING HEAD

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has $6\frac{1}{2}$ " swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

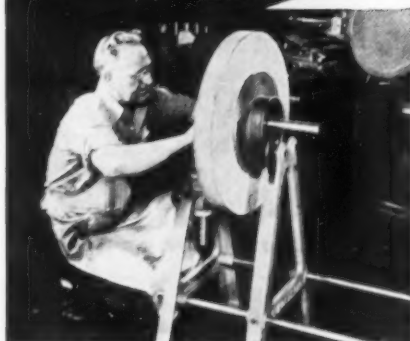
N
NICHOLS MORRIS
M
CORPORATION

76-G MAMARONECK AVE.

WHITE PLAINS, N. Y.

Use postpaid card. Circle No. 350

Balancing Tools for a Wide Range of Work



Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart below.

CAPACITIES

Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

FREE DATA



You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin 474.



SUNDSTRAND MACHINE TOOL CO.
2535 Eleventh Street, Rockford, Ill., U.S.A.

Use postpaid card. Circle No. 351

by merely selecting the desired trip plunger cam.

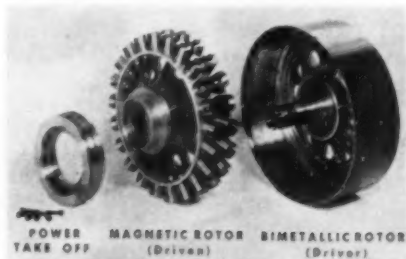
On cutting straight threads the carriers are held in a constant position. On cutting regular taper threads the carriers are cammed for a receding action. On cutting reverse taper threads the carriers are cammed for a closing-in action. Pipe thread capacity is $\frac{1}{8}$ " to $\frac{3}{4}$ ". The Eastern Machine Screw Corp., Dept. DR, Truman & Barclay Sts., New Haven 6, Conn.

Use postpaid card. Circle No. 87

Magnetic drive

The Whitney-Tormag magnetic drive provides a flexible slip-type drive between a motor and its load, in a range from fractional horsepower to over fifty horsepower. It consists of two parts—a magnetic rotor, which is a cylinder to which are attached strong Alnico V permanent magnets, and a bimetallic rotor, which is a copper-faced, mild steel plate or cylinder perforated with steel rivets. These two rotors are mounted face-to-face with an air space between them. If either of the rotors is driven, a torque is induced in the other through eddy currents, with the permanent magnets supplying the necessary magnetic flux. The driving and driven rotors are never in contact.

Advantages claimed are: Shockless, vibration free drive; no mechanical or fluid coupling—no contact except through the bearings, between drive and driven parts; smooth pickup for heavy, unbalanced or fluctuating loads; high



efficiency at rated horsepower (95%); unaffected by exterior temperatures from minus 60° F to 250° F.; fully reversible—can be used as a dynamic brake; motors powered to actual running requirements—no oversize provision or special winding necessary for starting or stalling demands.

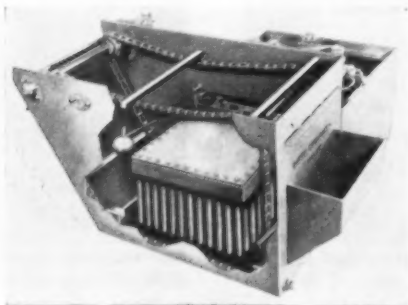
Whitney Chain Co., Dept. DR, Hartford, Conn.

Use postpaid card. Circle No. 88

Tubular screen type filter

The Delpark Filter-Matic filter has small diameter screen tubes which are manifolded together into a common suction header through which the sludge laden liquid is drawn by a special multiple chamber valve and pumped into a filtered liquid compartment. As the screen deposits reduce the liquid flow through the screen tubes, the unfiltered liquid level begins to rise. At a predetermined level, a float actuates a switch controlling the multiple chamber valve, reversing the flow of the liquid. The reversed flow backwashes accumulated deposits from the screens. As the reverse flow of clean liquid causes the unfiltered liquid to continue its rise, the float again reverses the flow of liquid through the valve, returning to the filtering cycle. Sludge removed from the screen tubes drops to the bottom of the filter compartment where it is removed by chain driven dragout flights.

When precoat is used, an automatic



January, 1957

LASSY MASTER V-BLOCK

ANGLE PLATES

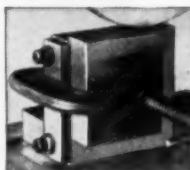
Proven Time Savers!

A Master tool of versatility for every day use in . . . inspection and machining operations.

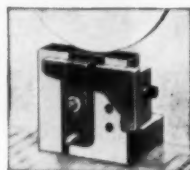
This Master V-Block Angle Plate is an improved new design. Saves hours of setup time. Assures precise work accuracy. Requires less skill.



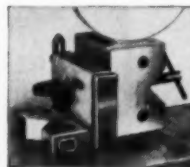
Side Gage automatically squares work precisely and without removing angle plate from chuck. Repetitive accuracy maintained.



Adjustable parallel holds the smallest work for position and clamping with ease and accuracy.



LASSY MASTER Angle Plate also provides a master setup for regrinding of worn or inaccurate Angle Plates.



The LASSY MASTER Angle Plate is an indispensable tool precisely accurate and dependable.

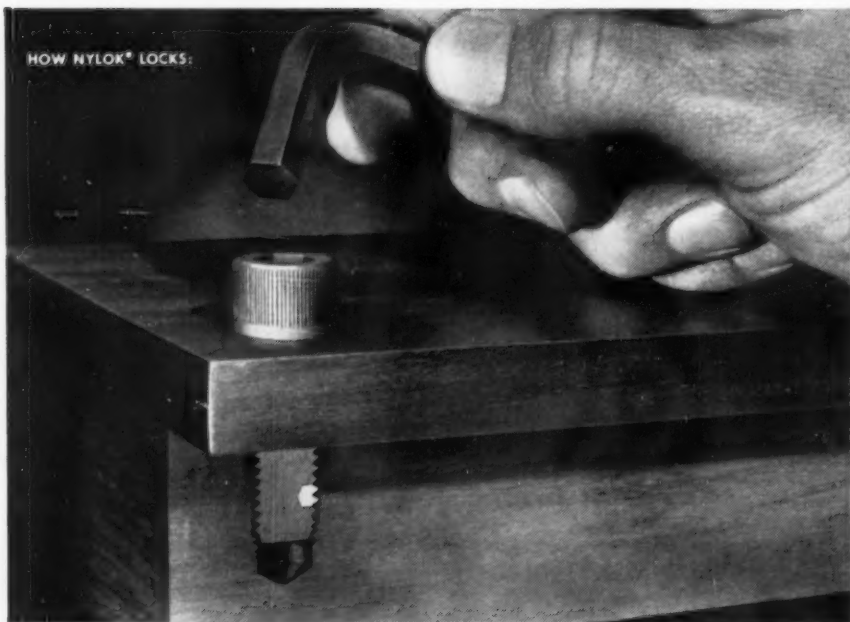
WRITE FOR ILLUSTRATED LITERATURE

LASSY TOOL COMPANY

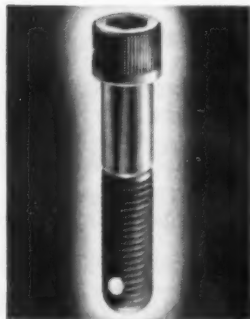
PLAINVILLE, CONN.

Use postpaid card. Circle No. 352

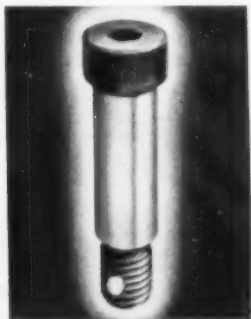
NEW—a complete line of socket screw products



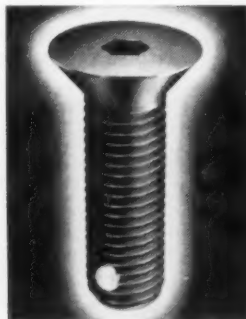
LOCKED! The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together, and locks the screw securely.



Socket head cap screws.
Standard sizes #6 to 1 in.



Socket shoulder screws.
Standard sizes 1/4 to 3/4 in.



Flat head socket screws.
Standard sizes #6 to 3/4 in.

self-locking UNBRAKO that won't work loose

They simplify design and save production time

UNBRAKO socket screws are now available embodying the Nylok® self-locking principle. Nylok provides a truly practical new solution to the problem of making screws self-locking.

An UNBRAKO screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not shake loose.

You save production time when you build products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly

wiring of cross drilled heads is eliminated. So are cotter pins and complex multiple set screw installations.

Self-locking UNBRAKOS are completely reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from -70° to 250° F. And, on properly seated screws, the pellet acts as a liquid seal.

Self-locking UNBRAKO socket screws come in a complete range of standard sizes and materials. See your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 52, Pa.

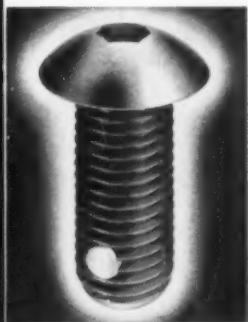
**T.M. Reg. U.S. Pat. Off., The Nylok Corporation*

STANDARD PRESSED STEEL CO.

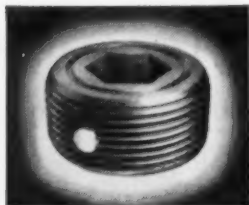
UNBRAKO SOCKET SCREW DIVISION

SPS

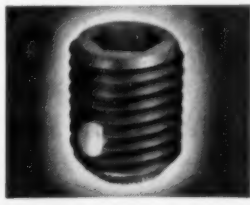
JENKINTOWN PENNSYLVANIA



Button head socket screws.
Standard sizes #6 to $\frac{3}{8}$ in.



Socket pressure plugs.
Standard sizes $\frac{1}{8}$ to $1\frac{1}{4}$ in.



Socket set screws. All standard point types. #6 to 1 in.

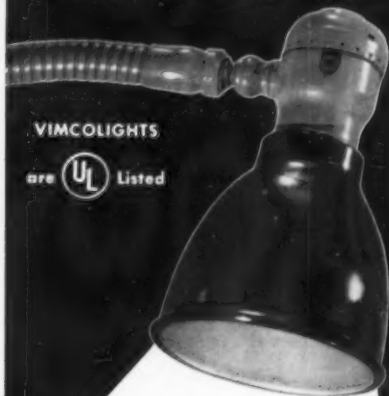
USUAL

plant lighting

DOES NOT prevent shadows

PROTECT YOUR PRODUCTION

against worker eyestrain and inaccuracies caused by shadows of head, hands or shoulders. Soft, comfortable light from Vimcolights... prevents fatigue... keep production humming. Be sure every machine you buy is Vimcolight equipped.



VIMCOLIGHTS

are  Listed

Vimcolights adjust easily for comfortable light. No bolts or screws to loosen, then reset. Strong flexible coil and 180° swivel.

Send for "OEM Brochure" Bulletin 75

VIMCO *Lights*

Manufactured since 1917 by

VIMCO MFG. CO., INC.

109 Brayton Street • Buffalo, N. Y.

Use postpaid card. Circle No. 354

measuring device with a vibrating mechanism to prevent bridging of the precoat material is mounted above the filter inlet and automatically feeds a predetermined amount of precoat material at each backwash period. Feeding device is actuated by the air cylinder feed which operates the multiple chamber valve. This automatically adds new precoat at the same time the old precoat is backwashed from the tubes. Industrial Filtration Co., Dept. FM-290, Lebanon, Indiana.

Use postpaid card. Circle No. 89

Portable shear, rod cutter

The Kar-ry No. 1 portable bench shear and rod cutter shears sheet metal up to 3/32" thick in any length and width; cuts rods up to 5/16" in diameter. The Kar-ry No. 2, a larger model, shears sheet metal up to 3/16" thick, and cuts round rods up to 1/2" in diameter. Blades are reversible and automatically eject the cut rods. Progressive Tool and Manufacturing Co., 842 Foxon Rd., East Haven, Conn.

Use postpaid card. Circle No. 90



MACHINE and TOOL BLUE BOOK

Two-ton punch press improved

Benchmaster Mfg. Co., Gardena, Cal. has now equipped its 2-ton punch press



with the same type of heavy-duty clutch recently installed on the 5- and 8-ton models. An oversize, sliding-key-type clutch dog is encased by a strong steel collar which removes the driving load from the crankshaft keyway.

Use postpaid card. Circle No. 91

Chatterless boring bar

This boring bar, equipped with a micrometer adjustment to adjust cutting tools in 1000ths, bores out material without chatter, absorbs shock and vi-



January, 1957



Micro Spray

LAY-OUT DYE

(Purple)

MICCRO Lay-Out Dye, long the leader in its field, now available in an AEROSOL package for SPRAYING.

All the advantages—instant drying; clear, sharp lines—*plus* easy-to-use, dependable, efficient MICCRO Spray container.

Regular MICCRO Supreme Lay-Out and Identification Dye in seven distinctive colors available as always in brush-in-cap and conventional containers.

Write for circular
on company letterhead

**MICHIGAN CHROME
& CHEMICAL COMPANY**

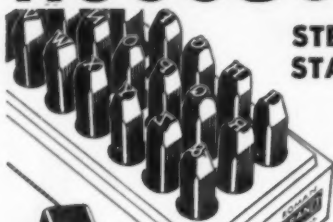
8615 Grinnell Ave., Detroit 13, Mich.

Use postpaid card. Circle No. 355



TO BE SURE OF
QUALITY
Remember
the Name

HOGGSON



**STEEL
STAMPS**



**CHAMFERED
CORNERS**
*for locating
the base*

**FINEST
STEEL**

long
life



**ALSO IN
REVERSE
FOR
MOLDS
& DIES**

Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

HOGGSON & PETTIS MFG. CO.
141H Brewery St. New Haven 7, Conn.

Use postpaid card. Circle No. 356

bration. Cutting tool at 53° or 90° angle; micrometer adjustment tool bit. The bar is graduated every quarter-inch to indicate depth of boring.

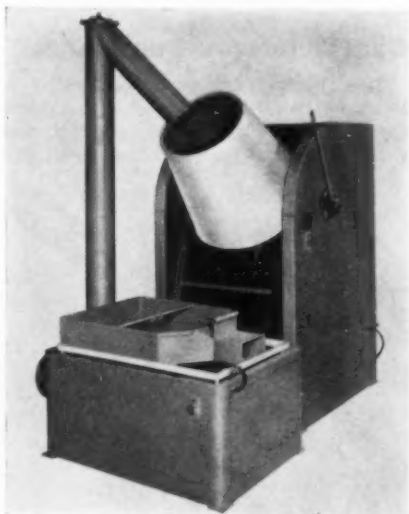
Modern Manufacturing Co., Inc., Dept. RS, Edgemont & Clementine Sts., Philadelphia, Pa.

Use postpaid card. Circle No. 92

Hot sawdust equipment

The Speed-D-Burr hot sawdust drying and polishing units may be ordered separately as a barrel unit only, as a barrel unit with deluxe elevator refill (photo) or as a barrel unit with standard mechanical separator. The barrel is a heat jacketed, all welded construction of heavy gauge tailored steel, 24"x24"—5 cu. ft. capacity. These units utilize power of a ¼ hp, 110 volt, single phase gear motor with switch and gas venturi, though on special order extra hp and/or three phase, 220/440 motors are available.

The deluxe elevator refill comes complete with top parts pan, a pneumatic vibrator separator, bottom storage pan



MACHINE and TOOL BLUE BOOK

and screw elevator for automatic barrel filling.

The standard mechanical separator comes complete with top parts pan, pneumatic vibrator separator and bottom sawdust storage bin.

The Mity-Mite hot sawdust unit comes complete with top parts pan, bottom storage and handling pan for separation with an enclosed and streamlined cabinet of heavy gauge tailored steel in aircraft truss design. The barrel is heat jacketed—all welded construction of heavy gauge tailored steel with a 1.2 cu. ft. capacity.

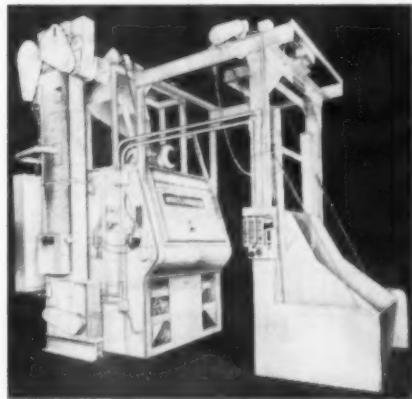
Speed-D-Burr Corp., Dept. KE, 3613 San Fernando Rd., Glendale 4, California.

Use postpaid card. Circle No. 93

Abrasive blast cleaner

This new size Super Tumblast airless abrasive blast cleaning machine for cleaning sand, scale, oxides, and other contaminants from metal parts that can withstand a tumbling action, has an operating load capacity of 14 cubic feet. Abrasive-hurling wheel throws 830 pounds of abrasive per minute.

Wheel maintenance problems have been minimized by the use of newly designed blades, a strain-free blade holding device to reduce breakage and



January, 1957

THE BEST PORTABLE ELEVATING TABLE YOU CAN BUY . . . (Eliminates Cranking)



2000 LBS. OR *1000 LBS. CAPACITIES
*ILLUSTRATED

A precision made MIDWEST TABLE Costs no more!

- ✓ It's hydraulic . . . positions work or feeds at desired height without use of hands
- ✓ Rigid cast construction
- ✓ Top turns 360° and clamps
- ✓ Foot release valve to lower
- ✓ Machined top surface can be used as work table
- ✓ Roller bearing casters with ball bearing swivels
- ✓ Floor clamping available extra

Write today . . . specials on request

MIDWEST
TOOL & ENGINEERING CO.

112 WEBSTER ST., DAYTON 2, OHIO

Use postpaid card. Circle No. 357

225

simplify replacement, a new easy-access wheel guard housing, and a revised system of Long-Lyfe wheel guard liners.

The 14-cubic-foot machine is available with either of two separators, one with super efficiency for foundry applications and the like, and another for less exacting requirements. The super-efficient separator makes certain that every pellet thrown by the wheel is effective metal shot or grit and that the optimum abrasive mixture is maintained throughout the blast cycle.

The cleaning machine is readily converted to automation because of standard power features. A single push button will actuate the entire sequence from loading to unloading, without the observation of an operator. Wheelabrator Corp., Dept. HS, Mishawaka, Ind.

Use postpaid card. Circle No. 94

Mechanical tubing available from stock

Joseph T. Ryerson & Son, Inc., Box 8000-A, Dept. HS, Chicago 80, Ill., now carries in stock cold drawn seamless steel mechanical tubing made to standard i.d. tolerances for the production of honed cylinders. In cylinder applications, the most important dimension is the i.d., and unless tolerances for



GET MORE POWER, SPEED, CONTROL WESTBURY

Horizontal Mills 1-U 2-U 3-U



Heat-treated, hardened spindle; all moving parts designed to withstand overloads in excess of 100% — Spindle mounted on adjustable tapered roller bearings — Dial and hand control for selecting and reversing — Splash lubricated spindle gear box, extra gear pump for added safety — Power feed and rapid traverse in all directions — Climb milling — Special safety devices prevent operating errors — All ways handcraped — Single lever engages rapid traverse to all movements.

- 12 speeds
- 28 to 1100 rpm or 35 to 1600 rpm
- Climb milling
- Tapered roller bearings
- Hand scraped ways



Maserati Corporation of America
Westbury, L. I., N.Y.

Distributors in principal cities

Write, wire or telephone for
descriptive literature

Use postpaid card. Circle No. 358

this dimension can be specified, the tubing that is received may not be suitable for cylinder use. This tubing can be specified to conform to standard tolerances for both o.d. and i.d. Sizes range from 2" through 9" o.d.

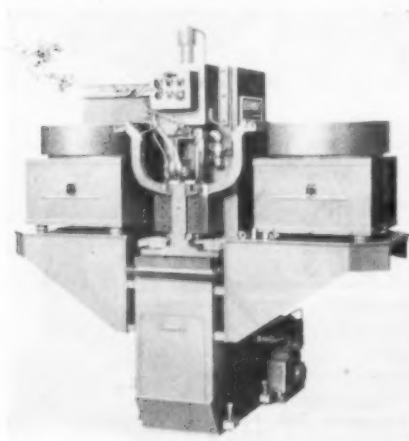
Use postpaid card, Circle No. 95

Press broaches 4160 radius grooves per hour

This hydraulic broaching press broaches a radius groove in both ends of two different length pinion gear blanks at the rate of 2,080 pieces per hour. The operation is fully automatic, requiring no operator. The blanks are loaded into hoppers on each side of the machine, positioned and loaded into feed magazines by vibration, pushed through stationary broaches by twin pushers attached to the hydraulic press ram, and unloaded automatically into ejection chutes.

Hopper loading can be done automatically, and the machine will stop if the hoppers are empty. The machine is compact, taking up a space approximately 9' wide by 4' deep by 5' high. Detroit Broach & Machine Co., Dept. 124, Rochester, Mich.

Use postpaid card, Circle No. 96



January, 1957

FOR SALE

Lasting SURFACE ACCURACY

any accuracy up to 40 millionths
any size or shape you need

Herman Balanced Granite with registered accuracy means you get a surface plate over which tools glide smoothly. All areas of Herman plates are above datum line and within specified accuracy for higher precision with longer useful life.

Write today
and state your
requirements



HERMAN SURFACE PLATE

Balanced
Granite



Registered
Accuracy

PLATE

NUMBER

THE HERMAN  STONE COMPANY

— First in Granite Surface Plates —

DAYTON 7, OHIO

Use postpaid card, Circle No. 359

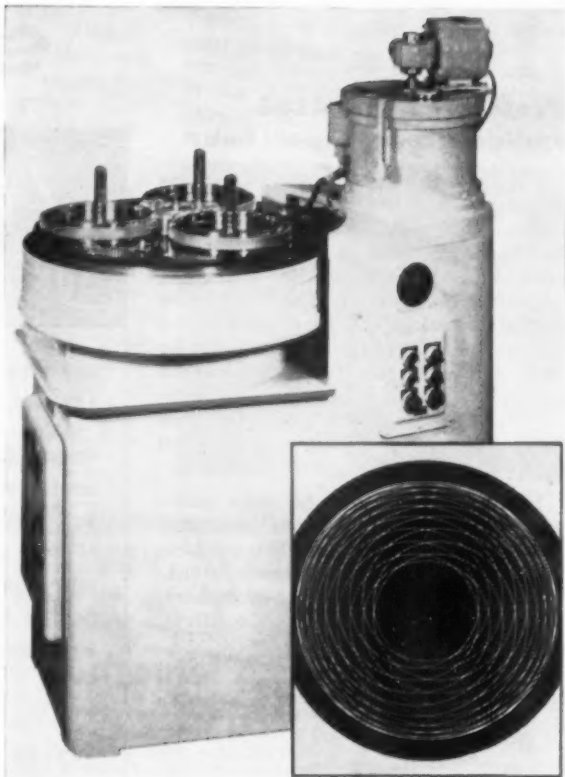
227

Lapping Machine Simulates Hand Lapping Motion

The exacting, tedious "figure 8" motion hand lappers used to attain fine finishing is now automatically simulated in the new Gyro-Matic "21" lapping machine developed by the Spitfire Tool Co., Dept. RB, 2931 N. Pulaski Rd., Chicago 41, Ill. The operation becomes push button after a pilot test is run on parts to be lapped.

Additional innovations include: positive counter-motion which rotates parts to be lapped against the motion of the lapping plate for greater speed and accuracy; six precision sealed ball bearings that support the lapping plate to assure uniform adjustment; a new type agitator operating on its own motor to keep abrasive compound in precisely correct suspension.

Use postpaid card. Circle No. 97



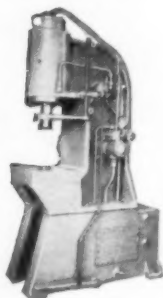
Greenerd ---
HYDRAULIC PRESSES

for - - ASSEMBLING • FORMING
 BROACHING • STRAIGHTENING
 STRAIGHTENING. **1½ to 75 Tons**

GREENERD ARBOR PRESS CO.
 141 CROWN ST. • NASHUA, N.H.

Send Today for
 Complete Cat. #556

Use postpaid card. Circle No. 360

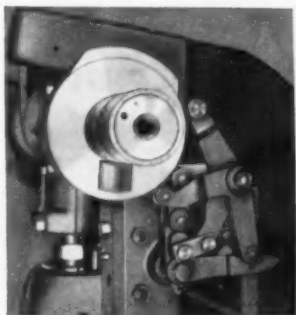


DISCOVER THE "difference"

in

SAFETY

With PRESS-RITE POWER PRESSES



PRESS-RITE Single Stroke Non-Repeat Mechanism is operated mechanically with two positive cams . . . a superior design found only on PRESS-RITE PRESSES!

More and more press users are standardizing with PRESS-RITE'S because of SAFETY. The PRESS-RITE Single Stroke Non-Repeat Mechanism is the safest on presses today. Operators have confidence in PRESS-RITE PRESSES. This keeps efficiency and production high . . . and insurance rates low! Make your next press . . . PRESS-RITE . . . and be safe! Air operated clutch and brake also available, optional.

Write for Press-Rite catalog No. 855 with illustrations and specifications of all models, 2 to 85 ton capacity.

PRESS-RITE DIVISION OF

SALES SERVICE MACHINE TOOL CO.

2357 University Avenue, St. Paul, Minn.

USED BY MORE . . . FOR MORE PRODUCTION

PRESS-RITE

OPEN BACK • INCLINABLE *Power Presses*

Gage block sets

Johansson thrift blocks have an accuracy and parallelism of $\pm .000008$ inch with a surface finish maintained from 1.0 to 1.5 micro-inch rms. The flatness is within .000006 inch. These "Thrifty-Jo's" give Class B block accuracy.

Set No. 1 consists of 84 blocks, which in combination will produce a half million different gage sizes. Set No. 2 includes 36 blocks which will produce over 150,000 different gage sizes.

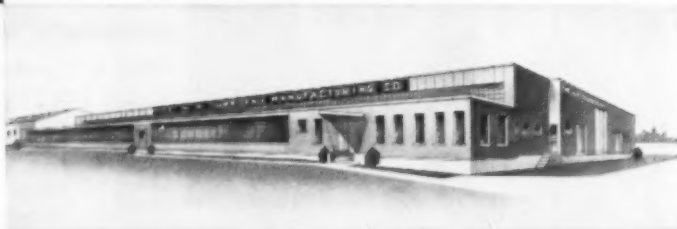


Brown & Sharpe Mfg. Co., Dept. DL,
Providence 1, R.I.

Use postpaid card. Circle No. 98



TOWNSEND of Hartford



4
lines of
automatic
machines
integrated
into
1

Big new factory to meet world demand for TOWNSEND Qualimatic MACHINES

The demand for Townsend machinery has quadrupled during the last few years. In order to bring under one roof the engineering, manufacturing, shipping and main offices for all 4 Townsend lines we have built this spacious, modern building. When in Hartford please come and see us.

THE H. P. TOWNSEND MANUFACTURING CO.

- High-Speed Shavers
- Riveters
- Automatic Screw Machines
- Special Machines

TAYLOR and FENN (Machine Division)

- Duplex Spline Millers
- Spring Presses
- Drilling Machines

CLEVELAND TAPPING MACHINE CO.

- Drilling and Tapping Machines
- Fitting Machines
- Indexing Tables

COCHRANE BLY

- Metal Sawing Machines

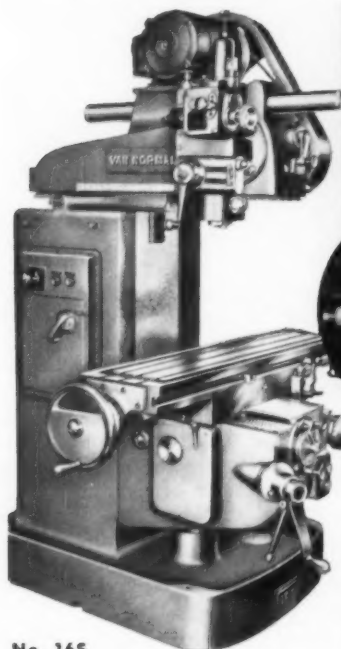
The H. P. TOWNSEND MANUFACTURING CO.
HARTFORD 10, CONNECTICUT

Use postpaid card. Circle No. 362

THE VAN NORMAN NO. 16S RAM TYPE MILLER

with the Quill-Type Adjustable Cutterhead

Gives you MORE VERSATILITY
PLUS MORE CUTABILITY than
Single Purpose Machines



Quill-Type Adjustable Cutterhead Mounted on Rugged Heavy Duty Ram Gives You Horizontal, Angular and Vertical Milling PLUS Accurate Boring and Drilling on ONE Machine.

No. 16S

Quill Travel: 4"

Quill Power Feed: .0015; .003; .006

22" Power feed to table

Cutterhead Spindle Motor: 2 HP

You can own this machine for as little as \$4.98 per day

A single investment in this one miller gives you the equivalent of two single purpose machines plus attachments at the much lower cost of a single machine. It is available in both plain and universal models. Write for complete details today.

Don't wait . . . for extra profits install a Van Norman now! They are available on many purchase plans — Outright sale . . . Purchase on conditional sales contract up to 5 years . . . Pay as you depreciate. See your dealer or write Van Norman Machine Company.

Conditional Sales Contracts not available to Export.

Write for complete details today.

VAN NORMAN MACHINE COMPANY

MANUFACTURERS OF — Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.

SPRINGFIELD 7,
MASSACHUSETTS

Machine Performs 47 Automatic Operations

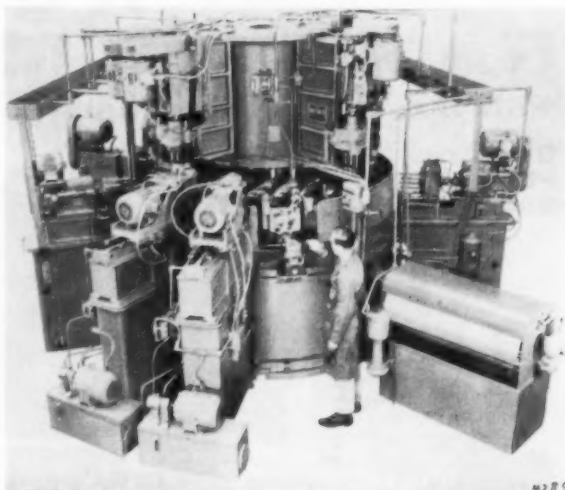
Forty-seven distinct operations are performed automatically on one-cylinder or two-cylinder refrigeration compressor housings by the Model 334-S machine at the rate of 120 parts per hour. Standard production units are mounted on a basic center column machine equipped with an 84" dia., 18-station hydraulic indexing table.

The total of 47 spindles are mounted on three 8-inch way-type units, six No. 2 Cam-Matic drill units and eight Air-Oil-Matic drill units. They are used to mill, drill, counterbore, spot face, bore, ream and tap housings.

Unit-type construction permits fast, easy re-alignment of the machine for product model changes, for completely new models, or for other types of products within the size limits of the machine.

Easy access to all tools is provided by the efficient mounting of the individual units. Vertical units are mounted on the stationary center column. Horizontal units are mounted on pedestals attached radially to the cast iron base.

Operation is completely automatic. The machine operator merely loads unfinished pieces into air-powered clamp-



ing fixtures, unloads completed parts, at the rate of one exchange each 30 seconds. The fixtures utilize an expanding arbor to locate the part with respect to a previous roughing operation.

Each of the drill units has independent feeds and speeds, permitting adjustment without affecting the entire machine. Preset for correct alignment, the individual unit performs the same operation each time the table indexes. All units are controlled simultaneously through an integrated electro-hydraulic system.

The Morris Machine Tool Co., 933-24 Harriet St., Cincinnati 3, O.

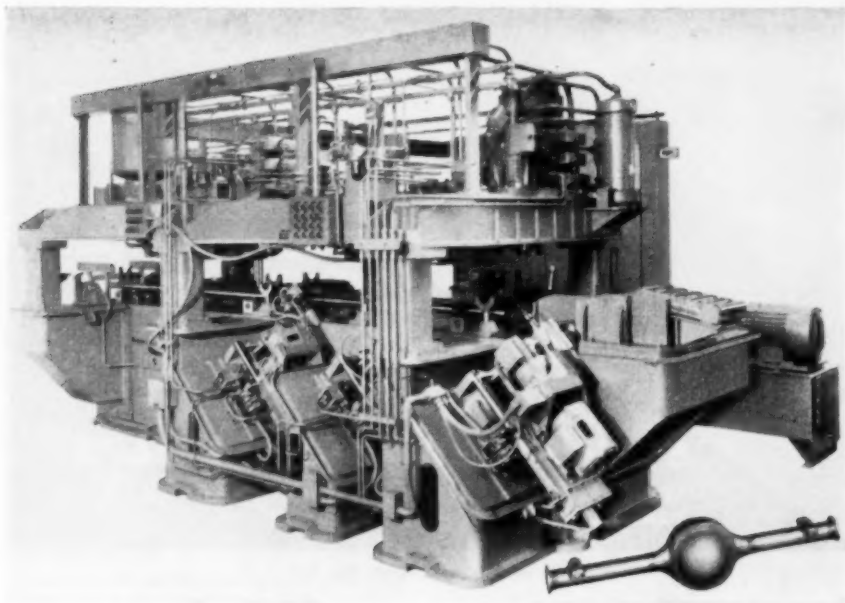
Use postpaid card. Circle No. 99

Special Machine Processes Axle Housings

The Line-O-Matic is designed to be mounted into the processing line and perform its series of operations automatically. It processes rear axle housings for both passenger cars and trucks.

Any of three different housings can be processed, with no additional locators being required.

A welded assembly, on which there has been no previous machining, is



automatically loaded, pierced, extruded, machined, assembled, and unloaded.

Machine is built to J.I.C. hydraulic and electrical standards. There is automatic lubrication throughout, and a

central coolant and chip system. The chips feed onto a conveyor, into the central plant system.

LaSalle Tool, Inc., Dept. JS, 3840 E. Outer Drive, Detroit 34, Mich.

Use postpaid card, Circle No. 100

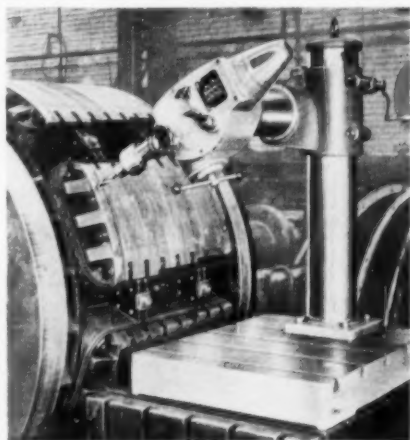
Swiss drilling and boring machine

The Oerlikon UB-2 all-angle radial drill and boring machine may be used either as a self-contained production machine tool, mounted on its own base, or as a portable unit. It is also designed for combination with other machines such as horizontal boring and milling machines for simultaneous or successive operation.

The boring head, movable vertically as well as horizontally, can be swung to any angle within the 360° and locked into position.

Distributed by Alfred Hofmann & Co., Dept. RS, 635 59th St., West New York, N.J.

Use postpaid card, Circle No. 101





**NOW,
for the
FIRST TIME**

... a tap specifically for screw machines. Shorter, more rigid shank. Cuts clean and free without "bellmouth."

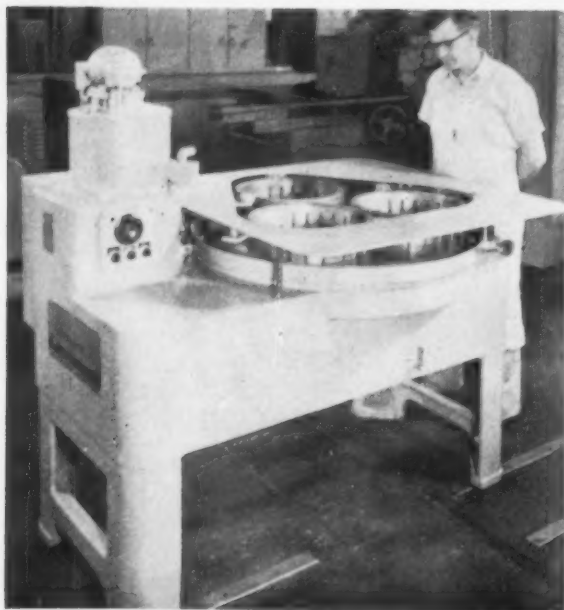
Reduces tap breakage. Lasts longer. Excellent for all machinable metals. Spiral point, high speed steel, ground thread. ... plug or bottoming types. Write for complete information.

STUB SCREW MACHINE TAPS

WIDE RANGE OF SIZES FROM STOCK AT THE PRATT & WHITNEY OFFICE NEAR YOU

Use postpaid card. Circle No. 364

Lapping Machine has Large Capacity



The 36-in. model Lap-master lapping machine has conditioning rings with inside diameter of 14½", thus permitting handling parts up to that size. Capacity-wise, the machine will take over twice as many 1" parts as the 24" model. The roller bar attachment provides the operator with shelf space for placing pressure plates or fixtures.

The drain hole on the 36-in. model is on the side, and a wiper blade is fastened to the underside of the base table to bring all of the spent compound into the drain. A rubber hose, fastened to the drain plug allows a container to be placed

under the machine and conveniently out of the way.

A fork style agitator is placed at a 30° angle in the agitator tank. This has been done to facilitate mixing of abrasive when left loaded in the tank for an overnight period, eliminating strain on the agitator motors.

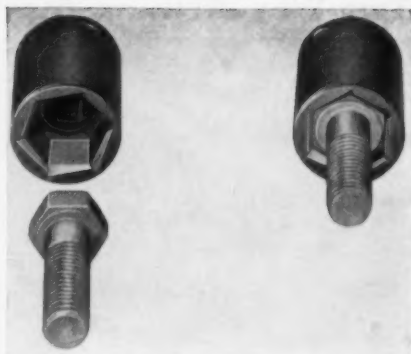
Lapping machine is capable of generating surface flatness to less than one light band and finishes to 2 rms in short or high production runs. Crane Packing Co., Dept. MEW, 6400 Oakton St., Morton Grove, Ill.

Use postpaid card. Circle No. 102

Socket and nut fully engaged in 1/6th of a turn

A "fast lead" type of impact socket has a specially-designed broached opening which allows the socket to fully engage the nut in 1/6th of a turn.

Using these sockets, single or multiple power tools may be operated continu-



ously, thereby speeding up the entire fastening operation. It is not necessary to start and stop the power tool for each operation, nor to hesitate before the socket makes initial contact with the nut. Hex broached openings range from $\frac{3}{8}$ " to 1".

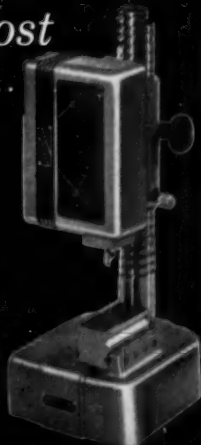
The Apex Machine & Tool Co., 1028 So. Patterson Blvd., Dayton 2, Ohio.

Use postpaid card. Circle No. 103

HIGH Precision at LOW Cost

THE PRATT & WHITNEY SIGMATIC COMPARATOR . . .

a moderately priced instrument that combines the simplicity and dependability of mechanical gaging with unusual accuracy. Magnification range from 300X to 5000X. Repeatability to millionths of an inch. Self-contained, readily portable. For a wide range of external gaging operations. Ask for Circular No. 599, Pratt & Whitney Company, Inc., 22 Charter Oak Blvd., West Hartford, Conn.

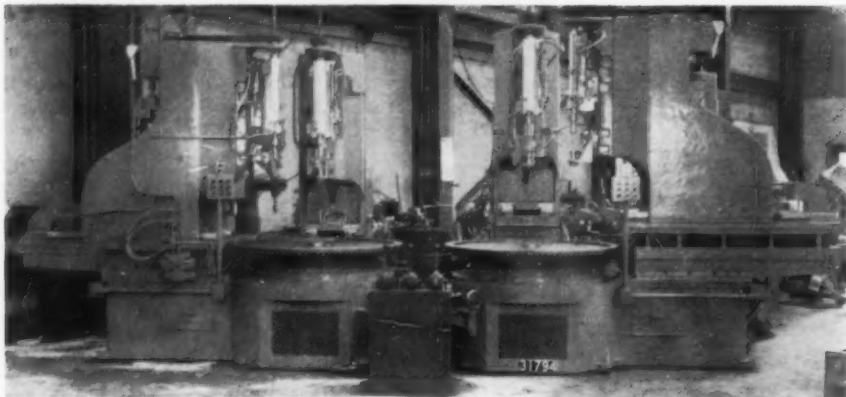


PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

Two-Way Drilling Machines

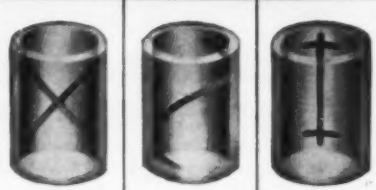


These two-way machines perform drilling operations on a variety of jet engine components for a West Coast manufacturer. Electrode index tables permit programming for different workpieces. The large standard way-type

columns move the drill units in and out for different bolt circles of work. Each machine employs variable feed, with six spindle speeds.

The Avey Drilling Machine Co., Dept. HS, Cincinnati 1, O.

Use postpaid card. Circle No. 104

 <p><i>Fischer</i></p> <p>Write for Catalog.</p> <p>Send parts for free grooving and production estimate</p> <p>ESTABLISHED 1900</p> <p>FISCHER MACHINE CO. ELEVENTH & WOOD STS. • PHILADELPHIA 7, PA.</p>	
	<p>... OIL GROOVERS</p> <p>The FISCHER No. 1 Oil Groover cuts a wide variety of grooves in bearings up to 8" in length and up to 5" inside diameter. A few simple settings permit you to cut continuous, relieved, straight or spiral grooves at any angle from parallel to perpendicular to the work. Grooves may also be cut in shafts, housings, etc. This machine will slash grooving time and deliver continuous profitable production in your shop. It will pay to find out what it can do on your grooving jobs.</p>

Use postpaid card. Circle No. 366



... "Positive Duplication—offered ONLY by CINCINNATI (PD)[®] GRINDING WHEELS—is a remarkable achievement in precision manufacturing and quality control!"

And no wonder everybody's shouting the praises of CINCINNATI (PD) WHEELS. You can save money . . . and increase your production . . . when (PD) WHEELS are on the job. For through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel every time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

For complete details, see your CINCINNATI

(PD) Grinding Wheels distributor, or contact us direct. We'll be happy to send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Telephone (or wire or write) Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—only CINCINNATI Grinding Wheels give you . . .

(PD) POSITIVE DUPLICATION

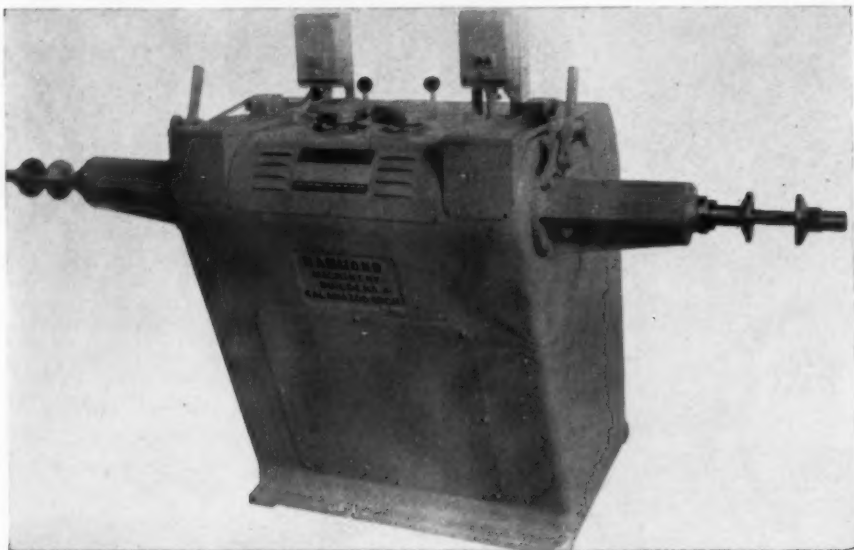
CINCINNATI
Grinding Wheels

A PRODUCTION-PROVED PRODUCT OF
THE CINCINNATI MILLING MACHINE CO.

[®]Trade Mark Reg. U. S. Pat. Off.

Use postpaid card. Circle No. 367

Polishing Lathe has 20" Swing



CAM MILLING

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

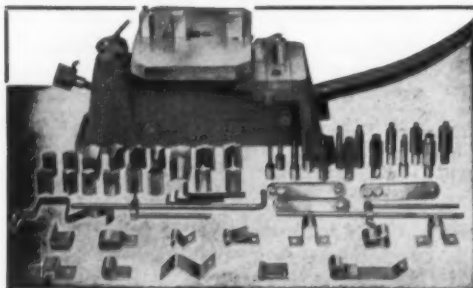
Your Inquiries Answered Promptly

HIMOFF MACHINE CO. INC.
23-22 44th Road Long Island City 1, N. Y.

Use postpaid card. Circle No. 368

The Model VRRW two-spindle, variable speed buffing and polishing lathe features a swing of 20" from side of base to face of inner flange.

The spindles operate independently, each having its own motor and variable speed control. This permits each operator to change wheels or vary speeds without interfering with, or causing down time to the other. Spindle speeds can be changed instantly while lathe



Multiform BENDER CUTTER

CUTS, BENDS, PUNCHES

Available in hand or air operated models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to punch, bend, and cut round or flat brass, bronze, aluminum, steel, etc., up to $1\frac{1}{2}$ " as illustrated, other models up to $\frac{1}{4}$ "x4".

J. A. RICHARDS CO.
KALAMAZOO, MICH.

Get the complete, revealing

Inside Story

on the finest tapping heads ever made!

Here's a feature by feature analysis on the amazing Procunier tapping line which clearly explains why they have consistently maintained tapping superiority in the industry for over 30 years! A true "peep-hole" story on the many outstanding construction improvements, the mechanical advancements and precision quality operating advantages that make Procunier heads a "must" in production plants everywhere! You'll learn why Procunier means more tapping hours with a minimum of "down-time" interruptions, accelerated production with fewer broken taps, fewer spoiled pieces and a "new-found" operating ease and convenience that helps operators maintain stepped-up production schedules. "Do more tapping, better, for less" is the slogan in progressive plants who have adopted Procunier heads in their tapping departments.

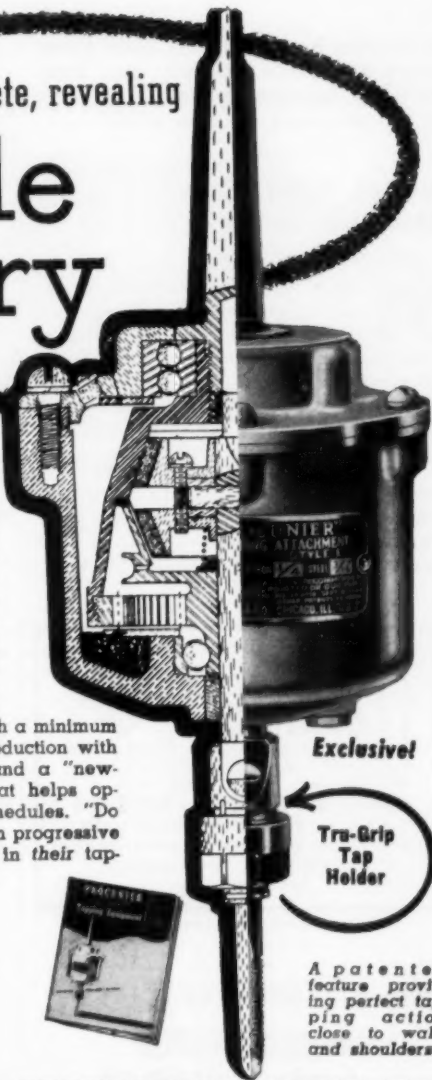
**Find out how you, too,
can benefit with Procunier—**

Write for Free Brochure
Today

PROCUNIER

SAFETY CHUCK COMPANY

14 S. Clinton St.
Chicago 6, Ill.



Exclusive!

**Tru-Grip
Tap
Holder**

A patented
feature provid-
ing perfect tap-
ping action
close to walls
and shoulders.

Procunier Safety Chuck Co.
14 S. Clinton St., Chicago 6, Ill. Dept. 1
Gents: Send me your illustrated "Inside Story"
—and fast!

Name

Address

City..... Zone..... State.....

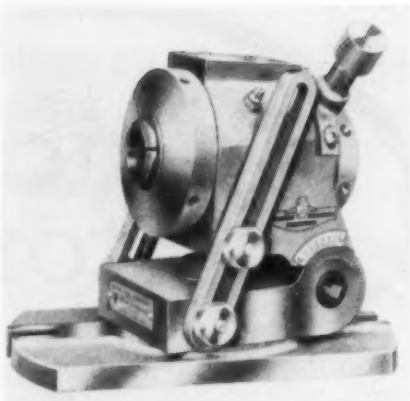
is running by turning the dials. Hammond Machinery Builders, Inc., Dept. 1614-JS, Kalamazoo, Mich.

Use postpaid card. Circle No. 105

Collet head ends indexing error

The Model C-404 universal dividing collet head permits fast, accurate indexing in milling, machining and grinding of parts. The redesigned tool utilizes interchangeable index plates available in a range of 2 to 36 spaces, permitting efficient operation and reducing opportunity for human error to a minimum.

There is a full 360 degree swivel of head on base and zero to 90 degree elevation with 1/20 vernier scale. Concentricity of collet sleeve bore is .0002 inch, the tool using standard 5C collet



with one inch capacity.

Kuma Tool Co., Div. of Production Tool Corp., 4712 S. Kenwood Ave., Chicago 15, Ill.

Use postpaid card. Circle No. 106



DRILL THESE HOLES
 BY A QUICK, EASY INEXPENSIVE METHOD
 Your business letterhead will bring literature
WATTS BROS. TOOL WORKS
 Wilmerding, Pa.

Use postpaid card. Circle No. 371

Buy safe "SHUR-GRIP"



drop forged HANDLES

Designed to hold 3 to 6 lb. lead hammer heads more firmly — will not slip — keeps hammer head in shape longer — makes remodeling easier, quicker, surer, less expensive.

Write for circular and prices
LAWRENCE H. COOK, INC.

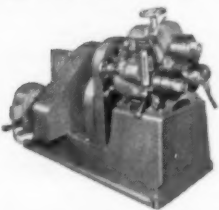
47 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

Use postpaid card. Circle No. 372



Beloit

**ANGLE
BENDING
ROLL**



Strength, compactness, and extreme versatility best describe this moderate cost, open end angle bending machine. Will bend angles, tees, leg in and leg out, flats on flat and on edge, also pipe, tubing, etc. Capacity 2x 1/4 angle or equivalent. Write for details.

*Buy
Beloit*

HENDLEY & WHITTEMORE CO.
 100 BLACKHAWK BLVD. • BELOIT, WIS.

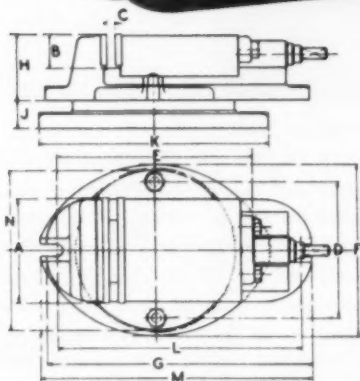
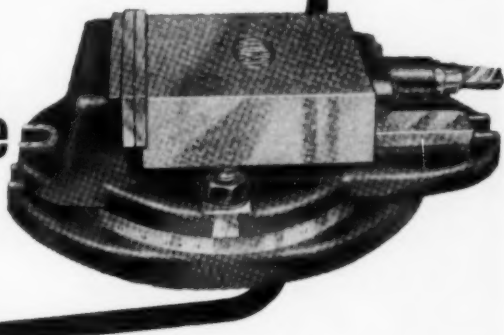
Use postpaid card. Circle No. 407

MACHINE and TOOL BLUE BOOK

Gives you dependable accuracy!

**ABWOOD
PRECISION
Machine Vise**

... with the sliding
jaw that can't lift
and tilt the job!



- Its sliding jaw runs on "Vee" slides, is fitted with adjustment for wear and has long bearing surfaces.
- Totally enclosed hardened square thread screw can't become seized or bruised.
- Sliding jaw machined over whole surface for use of scribing block.
- Accurately machine divided swivel bases indexed fully through 360°.
- Large capacity, powerful grip, sturdy construction and high quality finish.
- No traps for swarf.
- Low height with rigidity.
- Bases drilled and reamed for insertion of tenon buttons at right angles to vise jaws.
- Crank handle supplied.

SWIVEL VISES All parts interchangeable

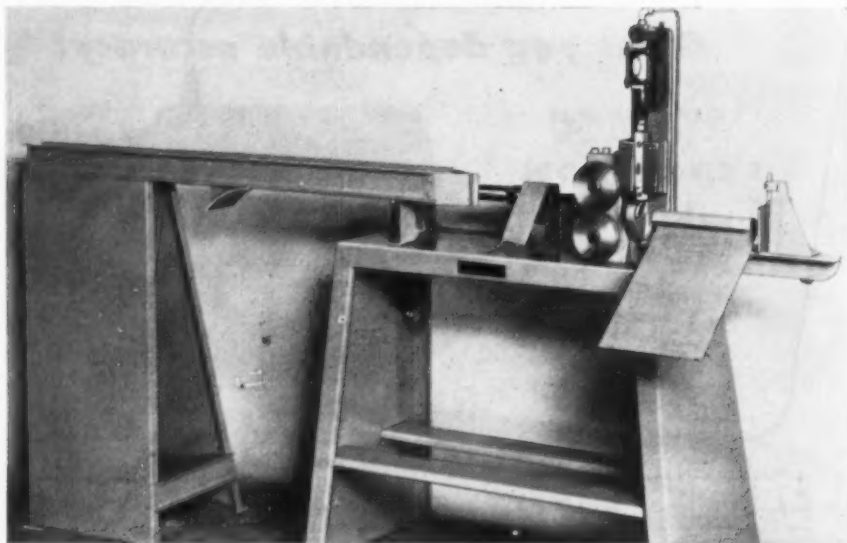
Size of Vise	A	B	C	E	F	H	J	K	M	Price
3"	3 $\frac{3}{16}$ "	1 $\frac{5}{8}$ "	2"	6 $\frac{1}{4}$ "	5 $\frac{3}{8}$ "	3 $\frac{1}{16}$ "	1 $\frac{1}{8}$ "	7 $\frac{1}{8}$ "	9 $\frac{1}{8}$ "	\$ 40.00
4"	4 $\frac{3}{16}$ "	1 $\frac{5}{8}$ "	2 $\frac{3}{8}$ "	8"	6 $\frac{3}{8}$ "	3 $\frac{1}{16}$ "	1 $\frac{1}{8}$ "	9 $\frac{1}{8}$ "	11 $\frac{1}{8}$ "	65.00
6 $\frac{1}{8}$ "	6 $\frac{3}{16}$ "	1 $\frac{7}{8}$ "	6 $\frac{1}{8}$ "	11 $\frac{3}{8}$ "	10 $\frac{3}{8}$ "	3 $\frac{1}{8}$ "	1 $\frac{3}{8}$ "	13 $\frac{3}{8}$ "	17 $\frac{3}{8}$ "	125.00
8"	8 $\frac{3}{16}$ "	2"	8"	13 $\frac{3}{8}$ "	12 $\frac{3}{8}$ "	3 $\frac{1}{4}$ "	1 $\frac{3}{8}$ "	15 $\frac{3}{8}$ "	22"	165.00
12"	12 $\frac{1}{4}$ "	2 $\frac{3}{8}$ "	12"		14 $\frac{1}{4}$ "	5 $\frac{1}{8}$ "	1 $\frac{7}{8}$ "	17"	24 $\frac{1}{8}$ "	275.00

Order today or write for further
information to Dept. B-1

DeWitt

DE WITT EQUIPMENT CORPORATION
190 ELIZABETH AVE., NEWARK 8, N. J.

Cut-off Machine for Extrusions



Model
UL 7120

The Leading Machine
Tool Manufacturers
use

**RUTHMAN
GUSHER**

COOLANT PUMPS

THE RUTHMAN MACHINE CO.
1817 Reading Rd., Cincinnati 2, Ohio

Use postpaid card. Circle No. 374

The Klaas Machine & Mfg. Co., Dept. RH, 4314 E. 49th St., Cleveland 25, O., has designed a cut-off machine for extruded materials. Air cylinders, controlled by micro-switches, actuate the rolls and cut-off blade. The rolls pull the extruded material, and dies can be made so as to mark the material being extruded. Speed is dependent on the rate of extrusion.

The extruded material is looped be-

More Capacity per Dollar

MODEL J-24 Capacity 24"x24". Largest capacity per dollar of any comparable saw. Completely hydraulic. Variable speed drive. Rugged, all welded steel construction. Trussed guide posts for extra rigidity. Big 1 1/4" blade on four band wheels handles large or small jobs with ease. Complete with coolant.

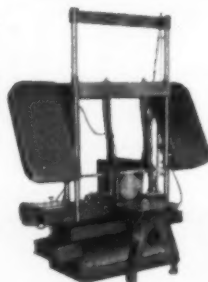
Write for FREE CATALOG!

Dept. B

W. F. Wells and Sons
Meta. Cutting Band Saws

THREE HILLERS
MICHIGAN

Model J-24



Use postpaid card. Circle No. 375



high scorer
...and in high speed steels,
it's always REX

Crucible's REX® high speed steel always scores highest in performance—as it has for more than a half century. That's because it is consistently sound and uniform in structure . . . with dependable response to heat treatment.

But don't take our word for it. Check REX for yourself—by any test you choose. You'll discover that recent improvements in manufacturing techniques have made it better than ever—why REX is today, as it's always been, *the standard by which all other high speed steels are compared!*

REX is immediately available at all Crucible warehouses, or on prompt mill delivery. For a list of helpful data on REX and other *special steels*, write for a free copy of the "Crucible Publication Catalog."

*Crucible Steel Company of America,
 Chamber of Commerce Bldg., 7th Ave.
 and Smithfield St., Pittsburgh 30, Pa.*

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

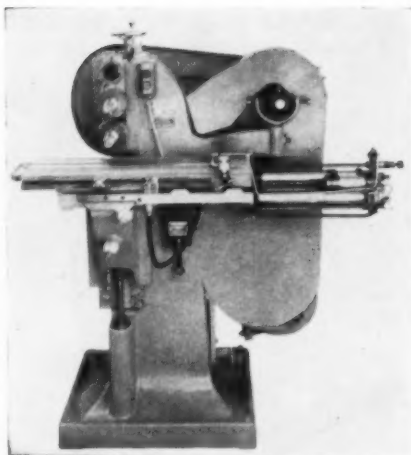
Canadian Distributor—Railway & Power Engineering Corp., Ltd.

fore it reaches the roll feed. A micro-switch at the end of the conveyor stops the machine if the loop is taken up. Sizes up to 1/2" of shearable metals can be cut. Speeds can be adjusted to any rate of extrusions.

Use postpaid card, Circle No. 107

Automatic feed, twin spindles double hand mill output

An air-hydraulic feed developed for use on U.S. hand mills combines with a new two-spindle head to double the production capacity of the mills. Equipped with a 12" stroke "skip" air-hydraulic table feed, the unit performs its multiple functions in the following manner: The automatic table feed provides rapid approach, controlled cutting speed and distance, a second rapid approach, a second controlled cutting area, and automatic rapid return. Two vises or other work-holding fixtures



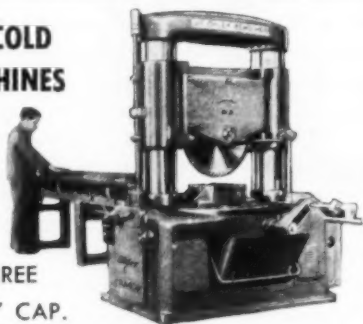
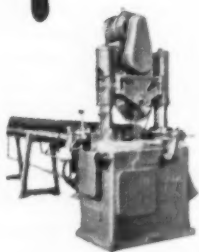
may be mounted on the table, so two or more workpieces can be milled during each complete pass.

The two-spindle head can also be adapted to U.S. Burke hand or power

Ohler

HYDRAULIC COLD SAWING MACHINES

VERTICAL,
RIGID, HIGH
SPEED TYPE.



AVAILABLE IN THREE
SIZES TO 15 3/4" CAP.

AUTOMATIC OR SEMI-AUTOMATIC
COMPARISON WILL CONVINCE YOU OF THE
OUTSTANDING AND SUPERIOR
PERFORMANCE OF OHLER EQUIPMENT

EXCLUSIVE FACTORY AGENT

JAMES W. GEORGE MACHINERY CO.
519 E. Jefferson Ave. Detroit 26, Mich.

OR YOUR DEALER

table feed millers. The lower spindle is mounted in a fixed position. The upper spindle may be raised or lowered to handle various sizes and types of workpieces, and to compensate for cutter wear.

The lower spindle is driven by V-belt from the backshaft pulley. The upper spindle is driven through a gear train from the lower spindle. The spindles rotate in opposite directions to permit conventional milling from both positions.

Automatic table feed device and dual spindle arrangement, singly or in combination, may be adapted to many types of products for faster milling at lower cost.

U.S. Burke Machine Tool Div., Cincinnati Mfg. Corp., Dept. HS, Cincinnati 27, O.

Use postpaid card. Circle No. 108

CAMS

To Your Specifications
except Screw Machine Cams

Design Assistance Offered

KIDDE PRECISION TOOL CORP.
25 LOCUST AVE. ROSELAND, N.J.

Use postpaid card. Circle No. 378



BORING TOOLS

Tools that will cut their own head diameter clean, running on dead center, proving they do have proper clearance.

No need to grind the heads of these tools away to make them cut clean.

And two-tips to give 100% more usable cutting head.

Guaranteed to be good. Send for literature and prices.

A. B. CRALEY & SON
60 KNIGHT AVENUE
CLEMENTON, N.J.

Use postpaid card. Circle No. 379

January, 1957

TORQUE WRENCH MANUAL

Sent
upon request

Formulas
Applications
Engineering data
Screw torque data
Adapter problems
General principle

P.A. **STURTEVANT** CO.
ADDISON **QUALITY** ILLINOIS

Manufacturers of over 85% of the torque wrenches used in industry

Use postpaid card. Circle No. 380

GRANT

RIVETERS . .

PIONEERS
and
PACEMAKERS
in their line



—head rivets from smallest to 1/2" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles

Write for literature and don't forget to send samples

THE GRANT MFG. & MACHINE CO.
CE Station, Bridgeport 5, Conn.

Use postpaid card. Circle No. 381

Small Boring Machine

The Jones & Lamson Machine Co., 522 Clinton St., Springfield, Vt., has recently acquired all manufacturing and selling rights to a small precision boring machine which was developed by Mecanair, Inc., Sudbury, Mass. It was primarily intended for boring small holes in instrument parts and housings in small production lots. It is capable of holding very close tolerances.

The work table is operated by an air cylinder and hydraulic check unit, which can be adjusted for varying amounts of feed. A cross slide can be attached to the work table for facing in the same cycle as the boring operation. An additional head may be added to perform dual boring.

Use postpaid card. Circle No. 109



Meter measures travel, rpm

The Maico MF-2 Speed-Feed meter measures and indicates linear rates of travel and rpm on lathes, boring machines, milling machines, and other hydraulically actuated machines where accurate feeds must be maintained. Feed rate pickup converts linear motion of any length of travel into an electrical signal. A large illuminated meter gives the reading directly, with push-button selection of four scale ranges from 0-1 to 0-125 inches per minute.

Models are available with four feed ranges or with combinations of feed rate and rpm scales. The small, fixed tachometer pickup has no moving parts and is easily mounted on the machine.



Maico Co., Inc., Industrial Div., Dept. RB, 21 North 3rd St., Minneapolis, Minn.

Use postpaid card. Circle No. 110

Cone to offer copying lathe

Henry P. Chaplin, president and treasurer of the Cone Automatic Machine Co., Inc., Windsor, Vt., has announced that his company has taken over the manufacturing and sales rights of the H.E.B. Pilot automatic copying lathe for the United States and Canada, under a licensing agreement with H. Ernault Batignolles, French machine

tool builder. The machine will be known as the Conomatic Pilot. It will be sold through the Cone sales organization.

H.E.B. has been marketing the Pilot lathe, redesigned for and adapted to the needs of American users, for the past few years. The machines were built for H.E.B. by Industrial Metals Corp. of Lansing, Mich.

Use postpaid card. Circle No. 111



WITH WOODWORTH CHUCKING EQUIPMENT

Yes, you could compare the delicate but firm technique of the Labrador Retriever with the strong but accurate diaphragms in N. A. Woodworth chucking equipment.

Your best machine will produce only as accurately as its work-holding device permits and Woodworth manufactures the most rugged, accurate and dependable chucks for precision machining in America.

We invite your inspection and consideration of Woodworth chucking equipment.

- Standard Diaphragm Chuck
- Air-Operated Diaphragm Chuck
- Bevel Gear Chuck
- Double Diameter Gear Chuck
- Finger Chuck
- Air-Operated Diaphragm Arbor
- Push-Lock Arbor
- Twist-Lok Splined Arbor
- Tork-Lok Collet Arbor
- Zero Spindle Inspection Fixture

WOODWORTH

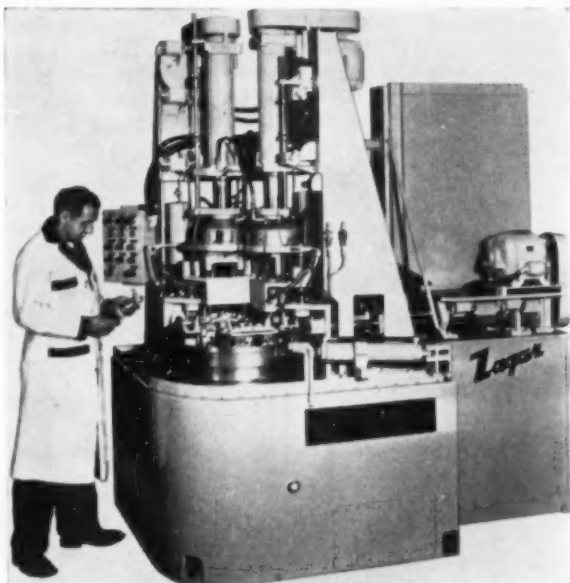
1300 EAST NINE MILE ROAD
DETROIT 20, MICHIGAN

Drilling, Reaming, Tapping Machine For Typewriter Supports

Zagar's drilling, reaming and tapping machine processes die-cast segment supports for an electric typewriter. The machine type is 4-station index. At the first station, 10 holes are drilled; four in the top face of the support and six more holes 90° from the top. At station No. 2, a vertical head reams two holes, .122" in diameter, and taps simultaneously four No. 10-32P holes in the outer face of the casting.

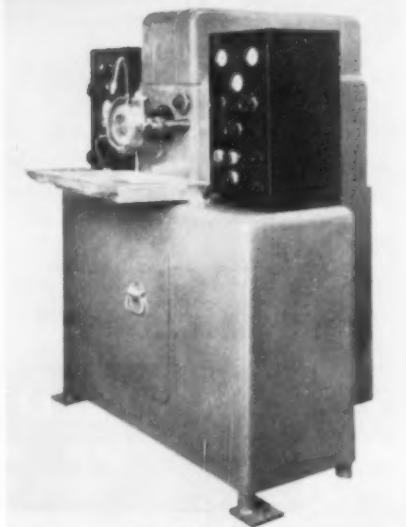
Feeds of the heads are by hydraulic units, each with 10" strokes. The tapping head has lead-screw for precise control. The indexing table is actuated by a standard air cylinder for automatic cycling. A shot-pin assembly positions the table. The machine is fully automatic with safety provisions and complete control panel. Zagar Tool, Inc., Dept. RH, 24000 Lakeland Blvd., Cleveland, 23, O.

Use postpaid card. Circle No. 112



Honing machine electronically controlled

This honing machine offers instantaneous use of ideal cutting speeds in the honing of fine precision parts. Limit switches control both the honing of the part and the complete usage of the honing stone. The same stone can be used to hog out stock and also obtain a fine low micro finish. Machine provides feed and speed control from 100 to 1600 rpm using limit switches and



**Precision Cuts
on Ferrous or
non-Ferrous
Metals**

Automatically

**with STONE'S
NEW MODEL M-75
BAR-FEED CUT-OFF MACHINE**

M-75 FOR FERROUS METALS CUTTING: Now . . . cut up to 550 pieces per hour of 1½" solid rounds or other shapes with a mill-like finish, and with no change in metal characteristics! Even on the longest production runs, the M-75 holds tolerances of $\pm .005$ " day in, day out. That's due to Stone's exclusive Automatic Wheel Wear Compensator, which adjusts for fast approach and regulated speed of cutting cycle by hydrocheck. Cutting head is engineered with geared-in-head drive, another Stone exclusive, to deliver maximum power at lowest cost.

M-75 FOR NON-FERROUS CUTTING: Possesses most of the features of the M-75 described above, with the exception of Automatic Wheel Compensator. Handles solid stock up to 3½" in diameter, or 4"-pipe and structurals . . . giving up to five times greater production.

M-35A MANUAL CUT-OFF MACHINE: Holds milled-finish tolerance of $\pm .005$ " on ferrous and non-ferrous materials at any degree of cut up to 45°—either direction. Geared-in-head drive. Cuts at less than 4 seconds per square inch.

SS-20LR TRAVERSE TYPE MACHINE FOR CUTTING SHEET OR PLATE STOCK: Cuts 4', 8' or 12' lengths with great accuracy due to rigid construction of base, and work stop mounted parallel to kerf. Control-panel or hand operated as desired.



**MODEL
M-75**

*"...represented in every
major industry throughout
the world"*

STONE MACHINERY COMPANY, INC.
Sales and Service in Principal Cities

**11 Fayette St.
Manlius, N.Y.**

variable speed motors. Automatic loading of workpiece is engineered to part characteristics.

Automatic cutting speeds start with a low rpm for roughing and when the part is within a predetermined ten-thousandth of finish size a very high rpm automatically takes over. Automatic sizing not only ends the honing cycle when desired size is reached but also permits the operator to visually explore the bore during honing.

Stone pressure control is also automatic, assuring the right cutting pressure as determined by stone characteristics and part specifications. Stone pressure is constant yet infinitely variable, and dangerous over-loading is prevented by the pneumatic circuit. Stone "feed up" is automatic and integral with the stone pressure control, eliminating repeated stone adjustments to compensate for stone wear.

National Pioneer, Inc., Box 668, Muncie, Ind.

Use postpaid card. Circle No. 113

Gage checks strip stock feeding to punch press

Continuous measuring recording gage Model 493 B-139 is mounted in a wheeled cabinet and is placed between a feed roll and a punch press so that the strip stock goes through the gage before it reaches the press. The gage can be moved from press to press as needed. By checking the stock continuously and observing the gage meter hand or the recorder chart, the thickness trend of the stock can be followed. The response of the gage is deliberately dampened so that local irregularities will not show and the gage will see an average stock thickness.

The recorder chart provides a permanent record of the thickness variation for each roll of strip stock which can serve as positive evidence of the condition of any particular roll. Also, it can be studied for information re-

Beverly THROATLESS SHEAR

Cut any Shape... **STRAIGHT OR IRREGULAR**



8-9 with Ball Bearing Hold Down

INSIDE SLOTTER

8" Reach — 16 ga. cap.
Makes inside slotting cutting faster, easier, cleaner. Punch and die arrangement of 5 blades assures accuracy, clean cutting action. Cuts $2\frac{1}{2} \times \frac{1}{4}$ " slot at one stroke. Throat design permits pivoting work at any point in stroke for special inside cuts. Note sample cuts at left.



INSIDE

Make any cut — curved, straight or irregular, faster, easier and better with less material waste on a Beverly Throatless Shear. You can turn work to any position and make a clean cut as you go. Handles heavy gauges with ease—light or metals without distortion. 4 models — capacities 18 gauge to 3/16" mild. All shears equipped with H.C. H.C. Blades for cutting Stainless.

See your Beverly Dealer or write for illustrated catalog.

BEVERLY SHEAR MFG. CO., 3005 W. 111th St., Chicago 43, Ill.

Use postpaid card. Circle No. 384



garding the effect that various thicknesses have on the finished stampings.

Gage shown here is adjustable to measure stock from .015" to .100" thick and from 5 to 18 inches wide. The stock passes between two crowned rollers, the bottom one being the reference contact and the upper one the sensitive or measuring contact. As the stock varies in thickness, the action of the sensitive contact is transferred to an electronic amplifier which moves the meter hand and the pen of the recorder. Federal Products Corp., Dept. DL, 1144 Eddy St., Providence 1, R. I.

Use postpaid card. Circle No. 114

Special 100-ton press

This 100-ton extruding machine has two slides for exerting horizontal pressures required to extrude piston pins approximately 3 1/4 inches long for truck engines.

Press is completely automatic. Productive capacity is approximately 2500

Hammond
OF KALAMAZOO

2 IN 1

NO-DUST GRINDER

BUILT-IN DUSTCOLLECTOR

SAVE OVER 90% FLOOR SPACE
THE HAMMOND WAY

DUST-LADEN AIR IS A MENACE!

- Protect your employees' health.
- Protect nearby machine tools from dust and grit.
- Save floor space — requires only 6 1/2 square feet. For 10", 12", and 14" wheels. Write for Catalog.

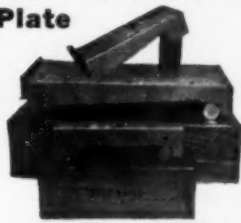
Hammond Machinery Builders
1814 DOUGLAS AVENUE KALAMAZOO, MICHIGAN

Use postpaid card. Circle No. 385

ACCURATE—LOW COST SINE BARS and PLATES 5" Sine Plate

only
\$37.50

- Guaranteed Accuracy
- Precision Ground
- Hardened Rolls
- Double Normalized
- Tapped Holes
- End Plates
- Solid Oak Case Extra
- Immediate Shipment



Sine Plates and Bars

No.	Cent. Dist.	Width	Price	With Oak Case
1905	5"	3"	37.50	43.00
1610	10"	5"	87.50	95.00
1785	5"	1"	21.75	28.25
1606	5"	6"	76.00	82.00

FOR ST. Paul

Accurate to .0002" in center distance and parallelism for the length of the tool. Order from your dealer or direct



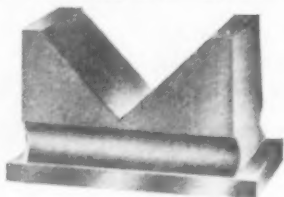
Bald Eagle Corp.

(Formerly Bald Eagle Tool Co.)

356 Cedar St. • St. Paul 1, Minn.

Use postpaid card. Circle No. 386

SEMI-PRECISION "V" BLOCKS FOR ALL-AROUND SHOP USE



STOCK NO.	BASE	CAPACITY	NET PRICE EA
10	4 1/2" x 3"	2 1/2" dia.	\$ 8.00
11	6 1/2" x 4"	4 1/2" dia.	16.25

Sturdily designed for hard usage . . . Ideal for drill presses, milling machines, shapers and planers. Will test round shafting for straightness . . . Made from aluminum alloy.

WRITE FOR DESCRIPTIVE BULLETIN

ACME TOOL COMPANY

71 West Broadway New York 7, N. Y.

Use postpaid card. Circle No. 387



Foreman of large precision tool grinding shop

"We save \$7,000 yearly by using ESSEX carbide burrs instead of mounted points."

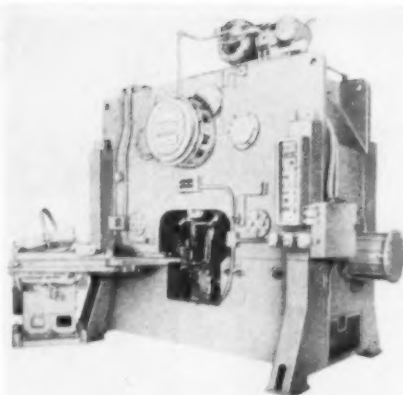
"We used to spend \$20,000 yearly for mounted points. Today, we do the same work with hand ground, precision-made ESSEX carbide internal grinding burrs costing only \$13,000 — a \$7,000 saving!"

Find out how ESSEX carbide tools can help you. Write for *free*, 12-page illustrated catalog today.

ESSEX ROTARY FILE & TOOL CORP.
295 Madison Ave., N. Y. C. 17, M&TB-76

My name
Company
Address
City Zone State

Use postpaid card. Circle No. 388



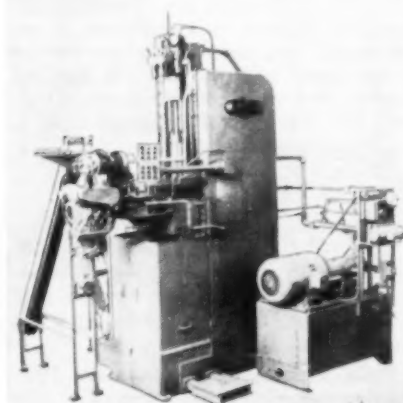
pieces per hour. An attached hopper supplies short lengths of bar stock to the feeding mechanism for extruding to size, including inside diameter and length. Previously the process of machining these parts involved approximately 43% more raw material.

Danly Machine Specialties, Inc., Dept. HS, 2100 South Laramie Ave., Chicago 50, Ill.

Use postpaid card. Circle No. 115

Automatic broaching machine

This pull-down machine has been built to provide tooling flexibility and



MACHINE and TOOL BLUE BOOK

easy maintenance in vertical, internal broaching applications. It is completely electrically controlled and all components are interlocked to provide continuous automatic operation.

For better maintenance accessibility, hydraulic systems are self-contained and are located outside the machine column. The unobstructed face of the column allows a wide range of tooling adaptation. Work table provides rigid support with minimum deflection for simple tooling as well as for the dial index type unit shown in the photograph.

Machine can be tooled with new radially locked pullers, hydraulically actuated and electrically interlocked to the machine cycle. This assures that broaches are positively locked in the pullers before machine cycle can continue. A further electrical interlock can be mounted on the retriever unit for proper positioning of broaches in the retriever heads during the broaching stroke. The fixed main cylinder is constructed to operate a massive slide travelling on hardened and ground rectangular ways in the machine column. Retriever unit is mounted integral with the main slide and on its own set of hardened and ground ways, providing broach alignment support through the major portion of the broaching stroke.

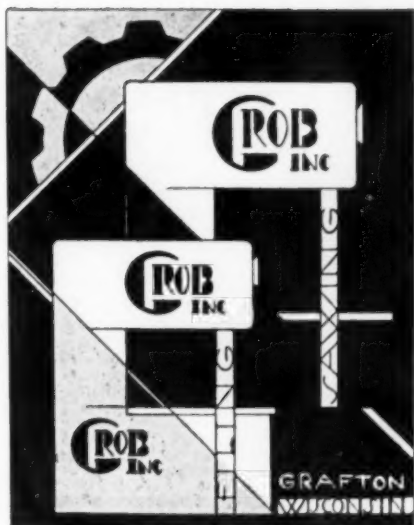
Machine has provision for the adaptation of a chip conveyor, loading conveyor, and work ejector for installations demanding fully automatic operation. American Broach & Machine Co., Dept. JS, Ann Arbor, Mich.

Use postpaid card. Circle No. 116

3 dimensional comparitor

By checking against a master, this 3D Comparitor gives readings on both two and three dimensional cams that are accurate to tolerances of $\pm .0002$ ", measurements of $\pm .0001$ " are possible on highest precision work.

Comparitor also makes possible the complete, 100% comparison of any two



GROB INC.,

GRAFTON, WISC.

Use postpaid card. Circle No. 389

SPRING LOADED LIVE CENTER



Eliminate excessive overhang of your center. Use the accurate, rugged, reliable *NIROL. The spring loaded Live Center that compensates for expansion and contraction in actual operation.

Write for complete information.

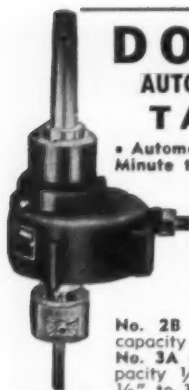
*Reg. U.S. Pat. Off.



***NIROL** MANUFACTURING COMPANY

900 H'WAY 22, N. PLAINFIELD, N. J.

Use postpaid card. Circle No. 390



DORMAN AUTOMATIC REVERSE TAPPERS

- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.

No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to $\frac{3}{8}$ " in Steel— $\frac{1}{2}$ " in Aluminum.

No. 2B POSITIVE TAPPER — capacity $\frac{3}{8}$ " to $\frac{7}{8}$ " in Steel.

No. 3A POSITIVE TAPPER — capacity $\frac{1}{2}$ " to $1\frac{1}{4}$ " in Steel— $\frac{1}{2}$ " to $\frac{3}{4}$ " Pipe Taps.

No. 4A TAPPER — capacity $\frac{3}{4}$ " to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from
\$55.00

Write for
Bulletin
IMMEDIATE
DELIVERY

THRIFTMASTER PRODUCTS CORPORATION

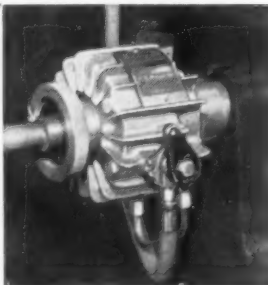
Division of Thrustmaster Industries, Inc.

1030 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FINE CENTER BOLLERS

Use postpaid card. Circle No. 391

WILSON AIR COLLET CLOSER



STEP UP PRODUCTION 20% +

. . . for most lathes to 1"
bar stock capacity

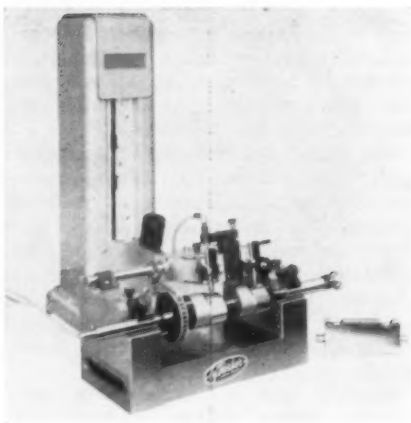
- Hold delicate parts without damage or adjustment
- Iron grip for heavy work
- No adjusting for stock or part variations
- Finger-tip or foot control eliminates operator fatigue
- Eliminates jarring of head stock

(Ten day FREE TRIAL to reliable firms)

**WILSON AIR COLLET
CLOSER, INC.**

909-B 40th Ave. NE, Minneapolis 21, Minn.

Use postpaid Card. Circle No. 392



or three dimensional cam. It gives readings on an infinite number of specified points—one, one hundred, one hundred million—and also measures an infinite number of points between stations, compared with a master.

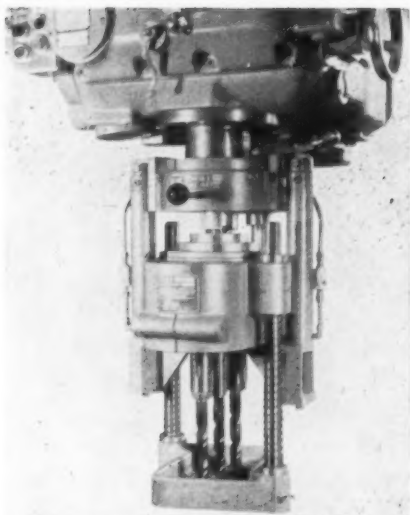
Fifty to sixty cams per day may be checked. An intricate three dimensional cam with 4000 stations which formerly demanded a full work week for inspection can be checked with this Comparator in less than four minutes the manufacturer claims. Parker Stamp Works Inc., Dept. DR, 650 Franklin Ave., Hartford, Conn.

Use postpaid card, Circle No. 117

Air counterbalance swivel attachment

A combination swivel and air counterbalance attachment makes it possible to adapt large multiple spindle drill and tapping heads to radial drilling machines. Attachment has built-in safety for the feed mechanism of the drilling machine and also for the operator.

Two cylinders maintain a balanced condition of the head on the machine. The air in the counterbalancing setup is controlled on both ends of the stroke. Therefore, only sufficient pressure is



maintained to counterbalance the weight of the head during all portions of the stroke. On the return stroke, the air is controlled to prevent extreme, quick return of the head, which could endanger the operator. With this attachment is furnished an air filter, a pressure regulator, and an air oiler.

U.S. Drill Head Co., Dept. HS, 616 Burns St., Cincinnati, O.

Use postpaid card, Circle No. 118

Gear shavers have new column design, built-in controls

Red Ring Models GCU 8- and 12-in. rotary gear shaving machines feature a new column design and built-in push-button electrical controls. Tunnels cast in the column provide space for electrical controls and enable compact flush-mounting of the two machine push-button control panels in the top of the column within easy reach of the operator.

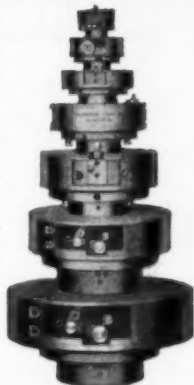
Separate cutter drive gear box in the top of the column simplifies maintenance.

MUMMERT-DIXON FACINGHEADS

Two-way tool feed in 9, 12, 16, 20, 24, 30, 36, 40 and 46 sizes.

One-way tool feed in 6, 9 and 12 sizes. Automatic feed — convenient tool adjustment — quick feed reverse. Save time and costly setups.

Write for
folder



MUMMERT-DIXON CO.

122 PHILADELPHIA ST. • HANOVER, PA.

Use postpaid card, Circle No. 393



LASSY TAPPERS

New exclusive features and top quality make Lassy Tappers outstandingly the finest available, for the tool room—small lot production—and the problem jobs. A low priced investment that soon pays for itself.

Write for illustrated circular showing 3 models, and also Universal Tap and Die Guide.

LASSY TOOL CO. Plainville, Conn.

Use postpaid card, Circle No. 394



Specializing in Stainless Steel
Standard and Made to Order Precision Parts
Send Your Blueprints for Prompt Quotations

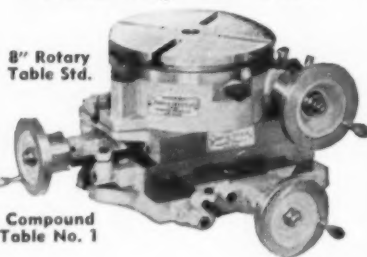
PEASLEE METAL PRODUCTS CO.
470 Tolland St.
EAST HARTFORD, CONN.

Use postpaid card. Circle No. 395

The **STEVENS** Line

SINCE 1925

Introducing **NEW series**



8" Rotary
Table Std.

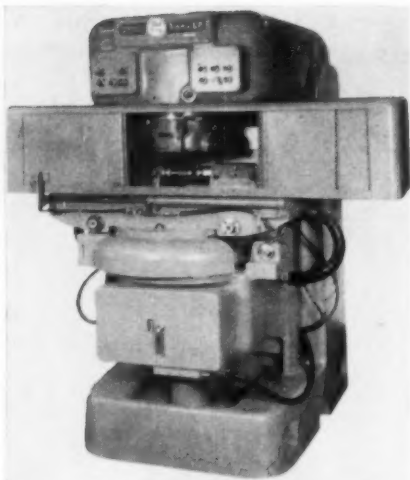
Compound
Table No. 1

ROTARY TABLES, 5-8-12-15-18-24" sizes
both standard & dial indexing types.
ADJUSTABLE TILTING TABLES, #1-2
COMPOUND TABLES, #1-2
ROTARY-COMPOUND TABLES #1-1½-2
INDEX CENTERS - multiple spindle

See your dealer or write for bulletins

The JOHN B. STEVENS Company
SOMERSVILLE, CONN.

Use postpaid card. Circle No. 396



nance. Former design had the gear box cast as part of the column.

Model GCU-8 in. is equipped for semi-automatic loading and will shave spur or helical gears up to 4 diametral pitch having pitch diameters from one to eight inches. Model GCU-12 in. shaves spur or helical gears up to 4 diametral pitch with pitch diameters from one to twelve inches.

Both models are made in three different types: (1) Universal, provides for conventional shaving of gears; (2) does not include crowning or taper shaving attachments; (3) provides only for basic diagonal shaving with the two-stroke cycle.

National Broach & Machine Co., 5600 St. Jean Ave., Detroit.

Use postpaid card. Circle No. 119

Tool ejector line expanded

Morse taper sizes 1 and 4 have been added to the Scully-Drift cam-type tool ejector line. This unit simplifies and speeds tool changes and virtually eliminates damage to machine spindles, bearings and tools often caused by hammering.

Ejector can be used with one hand, permitting the operator to hold the

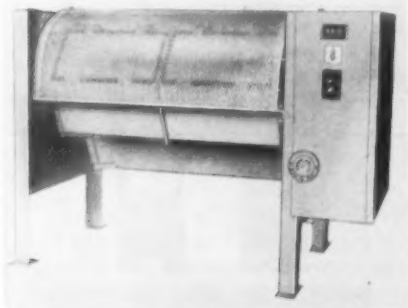
MACHINE and TOOL BLUE BOOK

tool with the other hand. It has a cam-shaped profile on its bottom edge. When it is inserted, at a slight angle to the centerline, a twist of the wrist generates a powerful force against the tang of the tool and breaks it free from its locked position in the internal taper. Scully-Jones and Co., Dept. JS, 1901 So. Rockwell St., Chicago 8, Ill.

Use postpaid card. Circle No. 120

Barrel finisher redesigned

The motor of the Model V-8 barrel finisher is now located at the rear of the machine where it is protected from water splash. The speed control handle is conveniently located at the front.



Another improvement is the use of a heavy wire mesh guard instead of a solid sheet metal guard in front of the barrels. This guard lifts up and back for easy access.

Finisher has a total capacity of 8 cu. ft. available in any interchangeable combination of 2, 4, 6, or 8 cu. ft. barrels. Power is furnished by a 1½ hp magnetic brake motor with jogging and reverse switch. Barrels can be furnished with no-seam vinyl plastic lining for extra wear and chemical resistance. Rampe Mfg. Co., 14915 Woodworth Ave., Cleveland 10, O.

Use postpaid card. Circle No. 121

January, 1957

Hammond
OF KALAMAZOO

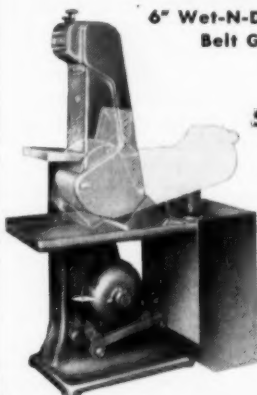
6" Wet-N-Dri Abrasive
Belt Grinder

For
FLAT
SURFACING

- Castings
- Forgings
- Plastics

Vertical or
Horizontal
Operation

WRITE FOR
CATALOG



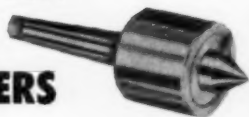
Hammond Machinery Builders

1614 Douglas Ave., Kalamazoo, Michigan

Use postpaid card. Circle No. 397

MANHATTAN'S MIRACLES!
TOP VALUE — LOWEST PRICE

HEAVY DUTY
LIVE
CENTERS



- #2 Morse Taper \$15.00
- #3 Morse Taper \$18.00
- #4 Morse Taper \$25.00

SAVE
40%

Hardened and ground • Sealed roller ball
bearings • Accurate free-turning point
Precision made in Western Germany

For tremendous savings, write for
circular listing sensational bargains.

MANHATTAN SUPPLY COMPANY

The Cutting Tool Discount House
151 A GRAND ST., NEW YORK 13, N. Y.
Telephone: CAnal 6-4992

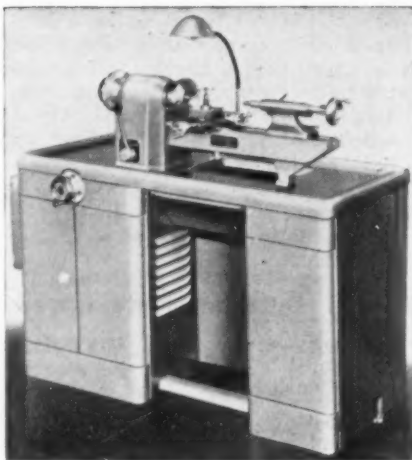
Use postpaid card. Circle No. 398

Precision bench lathe

Model No. 73 standard precision bench lathe is built with a hardened and ground bed, totally enclosed headstock of 1" collet capacity, and a 7" swing. The lathe headstock spindle is equipped with preloaded anti-friction roller and ball bearings. Standard equipment includes draw-in bar, offset-type tail stock with hardened and ground full bearing spindle, hand rest, dog face plate, centers, and center collet.

The variable speed drive is totally enclosed in the cabinet. Drive gives an infinite range of spindle speeds from 100 to 3500 rpm in over-all ratio of 35 to 1. Mechanical reverse gives a high-low spindle speed in ratio of 5 to 1.

The Wade Tool Co., Dept. DL, Waltham, Mass.

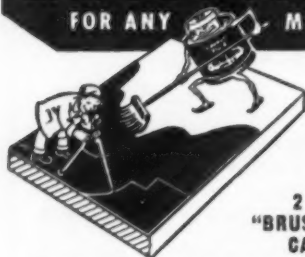


Use postpaid card. Circle No. 122

Don't forget to mention **MACHINE and TOOL BLUE BOOK**
when writing advertisers, or use the handy Readers'
Service card opposite page 64.

LAYOUT FLUID

FOR ANY METAL



TRIAL
OFFER

2 FOUR OZ.
"BRUSH-IN-CAP"
CANS: \$1.00

Send me my order of D-R LAYOUT FLUID
right away!

Bill me ☐ Bill my company ☐

Name

Company Name

Address

City Zone State

DAYTON ROGERS
Manufacturing Company

Minneapolis 7C, Minnesota

Use postpaid card. Circle No. 399



Name of Part—Brush Holder

Material—Leaded Brass

Cuts—1/8x3/16x1/2 slot

1/4x3/8 "T" Slot with 1/4"
Neck

Above cuts previously done in 3 operations
that took 20 seconds/Complete Piece

Now done in one operation that takes 3 seconds/Complete Piece

Name of Conn. Mfr. On Request

THE F. HALLOCK COMPANY

"BROACHING SPECIALISTS"

116 Main Street

Derby, Conn.

Use postpaid card. Circle No. 400



Wilson Diamond "Brale"* Penetrators

- A Minor load penetration
- B Major load penetration
- C Linear measurement of penetration increase



**To be SURE of your
ROCKWELL* hardness test
use only a
WILSON "BRALE"
Penetrator**

• WILSON Diamond "Brale" Penetrators are precision ground under high magnification to assure mathematical and microscopic accuracy. This meticulous attention to manufacturing detail, provides the extreme accuracy demanded of an instrument where the difference between a single degree of "ROCKWELL" reading is but 0.00008" penetration. N "Brale" Penetrators are supplied for use with WILSON "ROCKWELL" Superficial Testers.

A WILSON expert on hardness testing is never more than a few hours away. Prompt WILSON service guarantees top performance from WILSON equipment.

*Trademark registered

**A Full Line
to Meet Every
Hardness Testing
Requirement**

Fully automatic

•

Semi-automatic

•

Superficial

•

Taken
Micro & Macro
Hardness Testers

ACCO



**Wilson Mechanical Instrument Division
AMERICAN CHAIN & CABLE**

230-T Park Avenue, New York 17, N.Y.

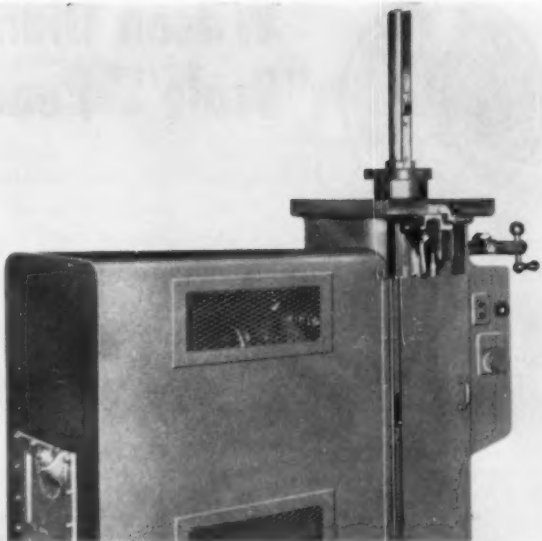
Use postpaid card. Circle No. 401



Hydraulic Keyseater

A new keyseater design applies hydraulic action for smooth performance. The crosshead of the hydraulic keyseater is actuated by a vane type pump that produces a crosshead working pull of over 7,000 pounds on the No. 2 machine and 9,500 pounds on the No. 3. The former will cut keyways to predetermined lengths up to a maximum of 12 inches, whereas the latter has a maximum of 15 inches. Mitts & Merrill, Dept. JS, Saginaw, Mich.

Use postpaid card. Circle No. 123



ROOFE HEAVY DUTY



**BULL NOSE
CENTERS**
**Guarantee
Perfect
Alignment**

Two double rows of ball bearings in the large and small ends of this Bull Nose Center mean perfect alignment on any type of work.

Two shank sizes provide diameters from $\frac{1}{2}$ " to $7\frac{1}{2}$ " for a variety of work with a single center.

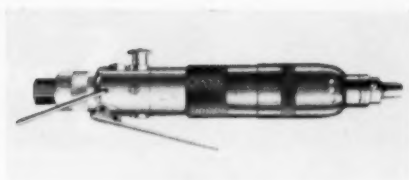
**Write for catalog.
Distributors Wanted.**

HOUSTON GRINDING & MFG. CO., Inc.
P. O. BOX 7261 • HOUSTON 8, TEXAS

Use postpaid card. Circle No. 402

Screwdriver features quiet exhaust

Dulcetone air-powered screwdriver runs with a quiet gentle exhaust, controlled by a streamlined new exhaust system that adds neither excess weight nor bulk, and permits tool to run at full rated speed and power. The screwdriver is powered by a standard Aro 000 series motor, preferred for its light



weight and high speed.

Models 7500-B and 7501-B can be reversed instantly in operation, with-

STEEL
Stanho
PRODUCTS

Taper Pins

made solid for

- ✓ STRENGTH
- ✓ SAFETY
- ✓ ACCURACY

**Proven Durability plus
Precision and Economy...
Clean Bright Finish**

Stocked in all sizes
#7/0 thru #14.

Special diameter
sizes made to order
"Stanho" makes a
complete line of **SOLID**
Taper Pins, Straight
Pins, quality Cotter
Pins, Woodruff Keys,
Machine Keys and
special parts to order.

"Stanho" Taper Pins are made from
selected steel bars, microscopically
free from any defects. Milled or
centerless ground precision types.
Also available made from Stainless
Steel, Monel, Brass, Aluminum or
other metals to your specifications.

Prompt shipments . . . in bulk or
conveniently packaged.

Write for
catalog
and prices

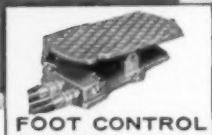
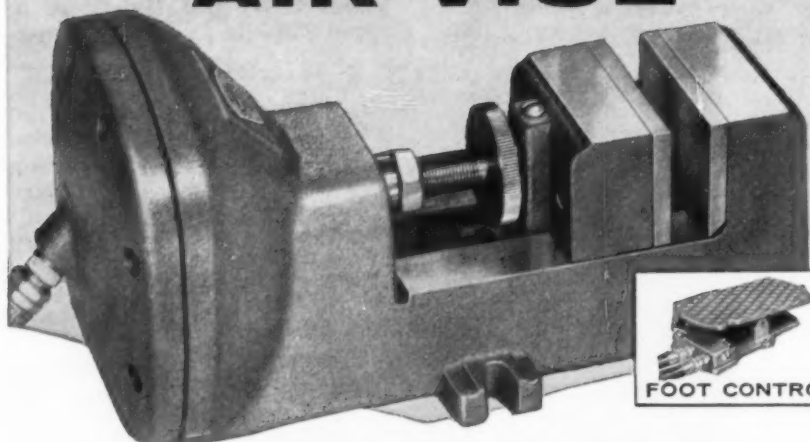
STANDARD Since 1872
HORSE NAIL CORP
NEW BRIGHTON, PA

JM-7

Use postpaid card. Circle No. 403

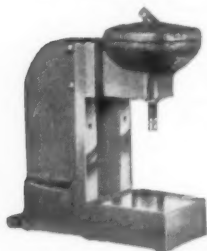
Speedy

AIR VISE



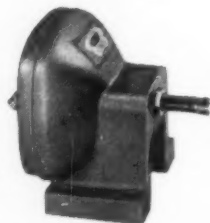
HIGH SPEED • POWERFUL GRIP

New, improved model speeds up all repeat operations—*milling, drilling, tapping, punching, bending, riveting*. Both hands left free to produce more! Light squeeze to 2250 pounds pressure! Extra thick jaws for attaching jigs. Jaws open to 3 inches; $\frac{1}{16}$ " to $\frac{3}{8}$ " maximum travel. With foot control and air hose. **\$44.00**



SPEEDY 1-TON AIR PRESS

Does the work of expensive presses! 5-inch throat; Ram 0 to 5"; stroke $\frac{3}{8}$ "; table 5" x 5". Operated by foot or our fingertip controls. \$85.00



SPEEDY AIR RAM No. 70

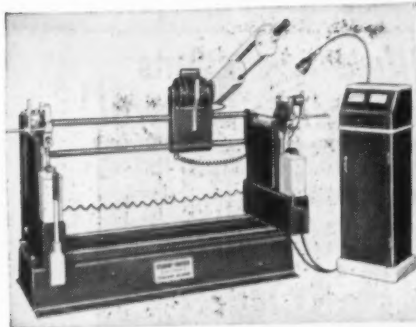
Mounts in any position. Compact, extremely sturdy. Exerts gentle pressure to one ton thrust. $6\frac{1}{2}$ " high, $5\frac{3}{4}$ " wide. \$35.00

Order from Your Supplier or Write for Air Tool Catalog

W. R. BROWN CORP., 2643 N. NORMANDY AVE., CHICAGO 35, ILL.

AIR REGULATORS • AIR VALVES • AIR FILTERS • PAINT SPRAYERS • AIR COMPRESSORS

NOW! *The most versatile, precision* **DYNAMIC BALANCERS** *...At Lowest Cost!*

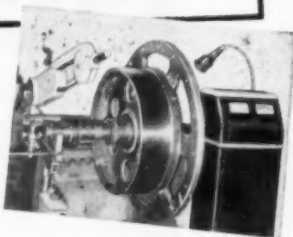


THE NEW STEWART-WARNER ELECTRONIC INDUSTRIAL BALANCERS

- 3 models for use in single-piece, short-run or long-run production quantities.
- Set-up time less than 2 minutes!
- For balancing a wide range of work on same machine—with no special tooling, coupling devices or accessories needed to change jobs!

**Only the Stewart-Warner Balancers
Offer These Maximum and Minimum Ranges:**

	Weight Range	Diametral Range	Length Range	Sensitivity
Model 704	½ lb. to 1000	½" to 44"	4½" to 55"	0.01 inch-oz.
Model 708	1 lb. to 5000	1" to 68"	7" to 83"	0.04 inch-oz.
Portable	In-place balancing of all rotating machinery.			



The new Stewart-Warner Industrial Balancers not only give you lowest first cost, but cut the cost of balancing *per piece* so low that even smallest shops can now afford their own precision balancing equip-

ment! Handle single-piece, short-run and long-run production, as well as maintenance of your own machines. Semi-skilled workers can learn to operate them in one day! Extremely versatile, sturdy, accurate.

Stewart-Warner Corporation



Write for
FREE
illustrated
brochure on
industrial balancing



Stewart-Warner Corporation, Dept. A-17
1834 Diversey Parkway, Chicago 14, Illinois
Please mail me all the facts about Stewart-Warner
Industrial Balancers.

Name

Company

Address

City Zone State

Use postpaid card. Circle No. 348

out need of releasing lever throttle. Operator merely pushes button for reverse rotation, releases for forward rotation, and uses only one hand. Button can be locked for reverse rotation if desired. Adjustable-clutch models can be preset to correct torque requirements. Clutch jaws automatically disengage when screw is set to desired tension. The tool can be easily converted to nutsetter.

Screwdriver has a capacity of No. 8 free running nuts and machine screws. Speed 1800 rpm. Aro Equipment Corp., Dept. JS., Bryant, O.

Use postpaid card. Circle No. 124

Conversion unit for drill riveting machines

A Huck and Hi-Shear conversion unit for standard Drivematic automatic drill

**over 8,000 Different Selections
For Immediate Delivery!**



**Quality-Famous, Heavy Duty
AIR AND HYDRAULIC**

CYLINDERS

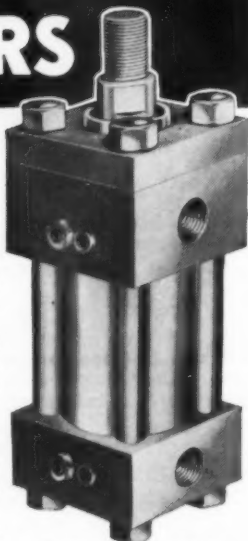
**now "In stock" for
immediate shipment to you
in popular sizes, mountings**

Eliminate costly production delays—speed-up your design and replacement programs—with this greatest quality selection ever offered on such fast delivery service.

AIR CYLINDERS, 200 psi, 1½" through 8" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

HYDRAULIC CYLINDERS, 2000 psi, 1½" through 5" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

Larger bores (up through 20" air, 12" hydraulic) and longer strokes (up to 22 feet) available on longer delivery.



**Write for Complete
Data and Prices**



MILLER FLUID POWER DIVISION

FLICK-REEDY CORP.

2026 N. Hawthorne Ave. Melrose Park, Ill.

CYLINDERS • BOOSTERS • ACCUMULATORS
Sales and Service—From Coast To Coast

riveting machines replaces the entire lower ram.

Lower ram tooling is quickly interchangeable and consists of anvil and snap in collar magazines. Lower anvils and components are easily changed for various collar sizes. Slug ejection is provided for Hi-Shear rivets. Standard Drivematic upper tooling is used to feed and buck the rivet.

Unit provides a clear 8" opening be-

tween anvils. General Riveters, Inc., Dept. RH, 785 Hertel Ave., Buffalo 7, N.Y.

Use postpaid card. Circle No. 125

Midget wrenches

The 15°-75° midget Superrenches now include 9/16 and 5/8 inch opening sizes. Wrenches are unusually thin and slim, recommended for delicate adjust-



**STOPS
PIPE THREAD
LEAKS**

PAT. PENDING

**Satisfaction Guaranteed Or
Money Back TRIAL OFFER**

TRU-O-SEAL Fittings are guaranteed to seal pipe thread connections permanently against all oils, practically all known chemicals and gases; to seal under high pressures or vacuum; to withstand —280° to plus 500° F.; to eliminate "overtightening" damage and pipe dope. Available in 1/8" to 2 1/2" pipe thread sizes.

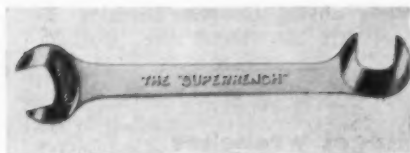
\$10.00 Trial Offer No. 1: six 1/8", ten 1/4", six 3/8", eight 1/2" pipe thread **TRU-O-SEAL** Fittings.

\$10.00 Trial Offer No. 2: six 1/2", ten 3/4", four 1" pipe thread **TRU-O-SEAL** Fittings.

Send order to

TRU-O-SEAL DIVISION
Flick-Ready Corporation
2026 N. Hawthorne Melrose Park, Ill.
"Miller Fluid Power" is also a Div. of Flick-Ready Corp.





ments and close quarters. They are drop-forged from selected alloy steel, heat-treated and finished in chrome-

plate over nickel. J. H. Williams & Co., Dept. RH, 400 Vulcan St., Buffalo, N.Y. Use postpaid card. Circle No. 126

Pilot-controlled air pressure regulator

Model 20AA-16 air pressure regulator is a 2" pilot-controlled, high capacity regulator for precision in air control over a wide operation range. It reduces



Consider your press operator when you consider an O.B.I.




You realize more from every man-hour if your operators know they're working with fine, dependable equipment. When it comes to O.B.I.'s that means Clearing. Find out why. Write for O.B.I. Catalog No. 215.

CLEARING PRESSES THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION

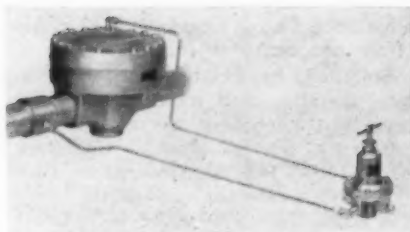
6499 W. 65th St., Chicago 38, Ill., Hamilton Plant, Hamilton, Ohio

Division of U. S. INDUSTRIES, INC. 



Use postpaid card. Circle No. 409

MACHINE and TOOL BLUE BOOK



line pressures of up to 400 psi. to working pressures of from 2 to 125 psi. Its

temperature range is from -40° F to 200° F.

Valve construction is balanced to insure a more accurate pressure control, minimizing the effect of a fluctuating primary pressure. The constant control pressure makes possible a greater valve opening. A pressurized chamber provides the control medium. Regulator can be installed at any point in the air system. C. A. Norgren Co., 3401 S. Elati St., Englewood, Colo.

Use postpaid card. Circle No. 127

"Standard" MILLING CUTTERS BY THE THOUSANDS!

**From stock — through
your Brown & Sharpe
NELCO distributor!**



Brown & Sharpe-NELCO—manufacturing over 3000 Carbide, Carbide Tipped and High Speed Steel milling cutters and accessories—stand behind the distributor displaying this plaque.

You can rely on him to save you days and dollars with superior tools, superior service!

Use the tools that really give you a COMPLETE selection... a speedy solution to all your cutter problems—over 3000 "standards" are as near as your phone.

Switch to the most complete source! See the Brown & Sharpe-NELCO Distributor in your area... today!

SEND for the New Nelco Catalog
just off the press, showing over 700
Carbide Tipped Cutting Tools.



NELCO TOOLS

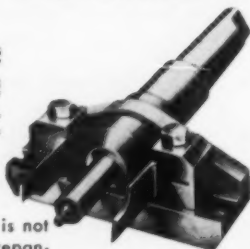
NELCO TOOL CO., Inc. • Manchester, Conn.

*For that **EXTRA** Edge
in Production!*

Use postpaid card. Circle No. 410

Cut Costs on Hole-Cutting! USE THE NEW . . . **BOREMASTER**

Finished holes
1½" to 11¾"
diameter to a
depth of 8"
on your pres-
ent equip-
ment.



BOREMASTER is not just another Trepanning Cutter, but a real heavy duty tool. Stock is removed in one piece eliminating waste. Remember . . .

TIME SAVINGS + MATERIAL SAVINGS
= COST SAVINGS

- Write us today for complete details!
Also without pilot, and shorter
shank for Turret Lathes, etc.

NEISE
MODERN TOOLS

KARL A. NEISE
404 4th Ave., Dept. MT,
New York 16, N.Y.

Use postpaid card. Circle No. 411

OBI press features extra throat depth

The semi-steel frame of the 3F 25-ton OBI press is heavily reinforced. Extra heavy clutch can be set for single stroke or continuous operation. Generous bearings are closely mounted to practically eliminate shaft deflection. Full-length V-type ram guides are precision ground to maintain true

alignment. Throat clearance is 15 inches (from ram center to frame).

Simplicity has been stressed to facilitate operation and maintenance; high precision machining assures uniform presswork. Service Machine Co., Dept. HS, 2310 W. 78th St., Chicago 20, Ill.

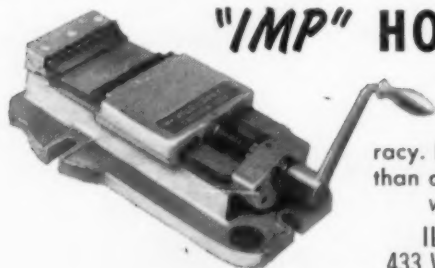
Use postpaid card. Circle No. 128

Portable electric drill

Model 134, standard duty, ¼" portable electric drill has a newly designed motor, which is rated at 2.5 amps.

Drill weighs only 3¼ lb. Standard speed is 1800 rpm. Its capacity is ¼" in steel and ½" in wood. Skil Corp., 5041 Elston Ave., Chicago 30, Ill.

Use postpaid card. Circle No. 129



"IMP" HOLD-DOWN VISES

WILL *Repeatedly*

Chuck work with gage block accuracy. No hammering or fussing. 80% faster than any other holding device.

Write today for 8 page IMP VISE brochure

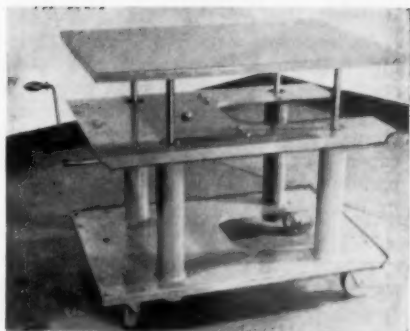
ILLINOIS METAL PRODUCTS
433 W. Superior Street, Chicago 10, Illinois

Use postpaid card. Circle No. 412

Tool and die elevating shop truck

The Lift-A-Load heavy-duty easy rolling elevating shop truck, with all weldment steel frame construction and generous size top deck, has 2-speed elevating mechanism compensating for both light and heavy load lifting. Wheels are steel, rubber tired. Dayton Rogers Mfg. Co., Dept. RB, Minneapolis 7, Minn.

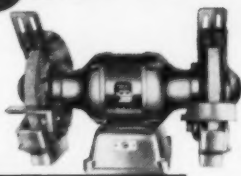
Use postpaid card. Circle No. 130



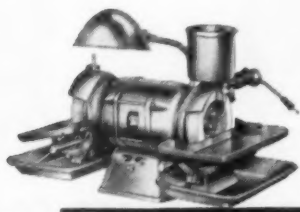
LESS VIBRATION... GREATER ACCURACY!

Baldor

GRINDERS



183-10" Grinder. Every part oversize and ruggedly constructed for hard, continuous use. 1 HP, 1725 RPM. Wheels: 10" x 1" x 7/8" — 36 and 60 grit. Ideal for grinding large, odd-shaped pieces. **\$148.00.**



Carbide Tool Grinder. Sharpens quickly, accurately. Reversible 1/2 HP motor withstands repeated overloads. 1 1/2" wide wheels **\$171.70**

Dynamically balanced Baldor Grinders provide smoother operation, far greater accuracy. Assure hours of relaxed, fatigue-free operation. Rugged . . . durable . . . the first choice of old hands who have tried 'em all.

- Lubricated for life ball-bearing motors never need servicing!
- Splash-proof, totally enclosed motors protect against dust, dirt, grit. Can't cause trouble.
- Models for every need! 1/4 to 3 HP, 6" to 12" individually balanced wheels. Bench and pedestal types.
- Every model fully guaranteed.

Write for Bulletin 321-M

BALDOR ELECTRIC CO.

4353 Duncan Ave.

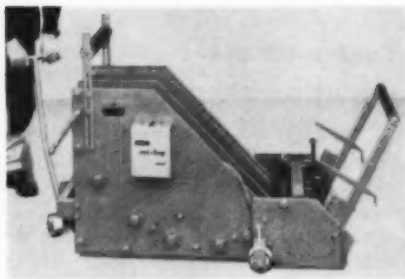
St. Louis 10, Mo.

Use postpaid card. Circle No. 413

Coil stock carrier made portable

An improved Koil Kradle, for supplying coil stock to presses and other equipment, is equipped with casters so that it may be moved easily from machine to machine. It is available in capacities from 1200 lb. to 16,000 lb., handling coils up to 48" wide by 60" in diameter.

Front wheels swivel for steering. As



NEW

Precise
POWER QUILL®

HIGH-CYCLE PERFORMANCE WITHOUT USE OF COSTLY HIGH-CYCLE EQUIPMENT

Continuously Variable Speed Range Through Electric Control with Simple Dial Calibration — 7000 to 25,000 RPM.

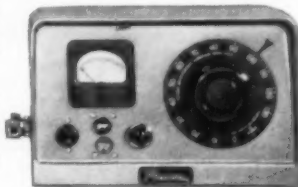
Largest and Most Powerful Available.

Super Accurate Collet Chuck with 1/2" Capacity to Insure Maximum Rigidity for modern precision demands. (Available also with solid quill extension for mounting wheels to 1/2" I.D. and 2 1/2" O.D.)

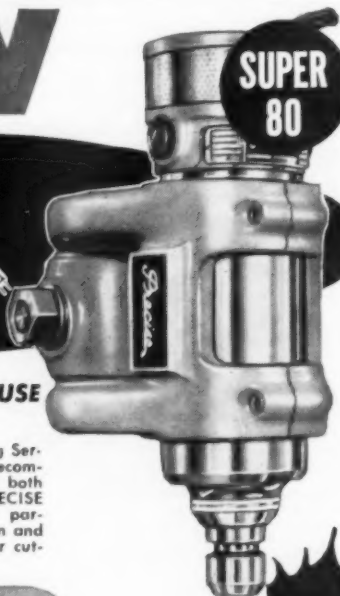
Unlimited adaptability to single or multiple grinding-milling operations . . . Tolerances of .0001".

Operates from standard 115V power supply.

Our Complete Engineering Service is available for recommendations and advice both on the application of PRECISE POWER QUILLS to your particular production problem and for the use of the proper cutting tool on your job.



Control cabinet permits speed regulation with meter calibrated in RPM.



FULL
1 1/2
H.P.
AT THE
QUILL



Precise

PRECISE PRODUCTS CORP.

3731 BLUE RIVER ROAD, RACINE, WISCONSIN
QUALITY AND PRECISION SINCE 1882

Use postpaid card. Circle No. 414

MACHINE and TOOL BLUE BOOK

tongue is lowered, bed is lifted by a cam, clearing the floor $\frac{1}{4}$ ". With tongue in vertical position front of bed is lowered to set solidly on the floor. Benchmaster Mfg. Co., Dept. KE, 1835 W. Rosecrans, Gardena, Calif.

Use postpaid card. Circle No. 131

Torque wrench has "built-in brain"

A highly responsive sensing device in the release mechanism of this power

torque wrench accomplishes difficult jobs with no effort or attention on the part of the operator.

One of the more important of these is the setting of self-tapping screws in sheet metal assemblies, where the tapping period of the run-down requires a higher torque than is desirable on the final finish tightening of the screw. Torque output is controlled to automatically compensate during run-down

Pair of Profitmakers... *these* **SCHAUER SPEED LATHES**



*Polishing conical brass adapter with
Schauer Type NAO Speed Lathe.*

These versatile, low-cost machines handle an almost unlimited variety of work—deburring, lapping, filing, trimming, polishing, etc. Thousands in use, *profitably!* Many sizes and models with holding devices to suit the job. *Speed your production* with Schauer Speed Lathes. Write for Catalog No. 530.

SCHAUER MANUFACTURING CORP.

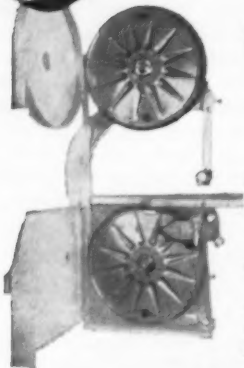
4502 Alpine Avenue



Cincinnati 36, Ohio

Use postpaid card. Circle No. 415

Carter - IZE with band saw accessories used as standard equipment by leading band saw manufacturers.



- Rigid Band Saw Wheels
- Band Saw Tires
- Micro-Guides
- Guide-Line Lights

CARTER PRODUCTS CO. INC.

439 Wm. Alden Smith Bldg.

30 Ionia Avenue, S.W.

GRAND RAPIDS 2, MICHIGAN

Use postpaid card. Circle No. 416

NIELSEN

Heavy Duty

*Live
Centers*

Write for
catalog on
live centers

Adapted
for heavy
duty work.
Precision type
ball and roller
bearings assure
maximum capac-
ity for high speed
production and long
service.



NIELSEN, INC. LAWTON, MICH.

Use postpaid card. Circle No. 417



for a tight thread screw fastener, so that the foot-pounds resistance of the thread will be added automatically to the final torque release setting for a more uniform pull-down tension, regardless of thread fit, etc.

After being set for a given torque, the wrench starts the run-down of the screw irresistibly, without impacting or ratcheting. During the continuous run-down, it senses the tightness, or resistance, of the screw thread or other resistance, and adds that same value to the final setting torque.

Where the screw is tight at first, but becomes loose just before the final torqueing, it readjusts to subtract the value added during the tight part of the run-down. This always happens in self-tapping screws. The wrench releases completely, to free wheel until the next cycle.

Wrench units are available as complete hand-held power tools, units adaptable to drill press for jig assembling of screw fasteners, and multiple mounting in special gang arrangements

on special nut-setting machines. Ohlsson & Rice, Dept. KE, 3340 Emery St., Los Angeles, Calif.

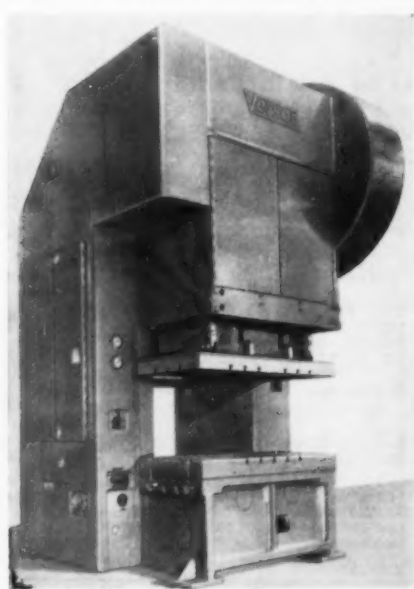
Use postpaid card. Circle No. 132

Completely enclosed gap press

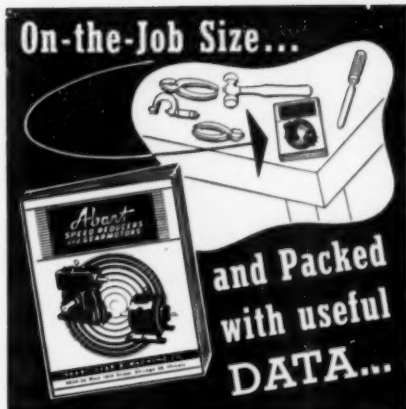
Streamlined gap press features totally enclosed piping and wiring of all air, lubrication and electrical components. In addition, gears, flywheel, clutch and all other moving parts are full enclosed for safety and convenience.

Die space area is well lighted and there are receptacles and pockets for safety blocks to prevent the press from operating while men are working in danger areas. Service outlets of 440 and 110 volts provide power for portable electric service tools, and a self-contained air supply system provides air-powered service outlets. Exact position of the ram at any point in the stroke is shown by an electric indicator.

Verson Allsteel Press Co., Dept. HS, 9300 S. Kenwood Ave., Chicago, Ill.



On-the-Job Size...



and Packed with useful DATA...

This 96-page ABART handbook on SPEED REDUCERS • CUSTOM-CUT GEARS is yours without obligation. Write for your free copy today.

ABART GEAR and MACHINE CO.

4829 WEST 16th STREET • CHICAGO 30, ILLINOIS

Use postpaid card. Circle No. 418

WALLS TU-WAY BELT SANDER

USE IT EITHER WAY

Full 1/3 h.p. G. E. Motor



VERTICAL

HORIZONTAL

At last, a top quality industrial sander that provides all the most wanted features - yet sells for so little. **\$89.95**

complete with cord, plug, switch ready to use

Illustrated Literature on Request

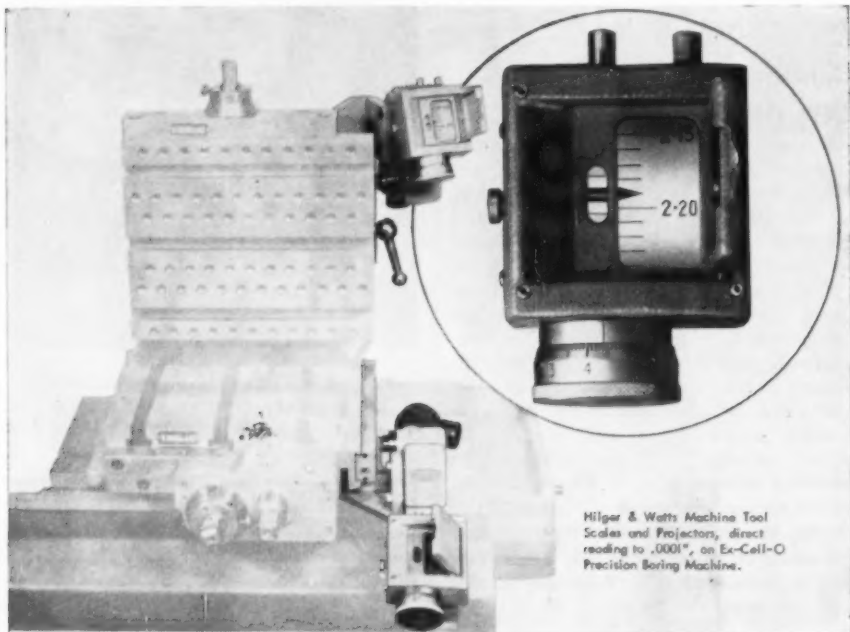
A few desirable distributor territories still available.

WALLS SALES CORPORATION

333 Nassau Avenue Brooklyn 22, N. Y.

Use postpaid card. Circle No. 419

Boring Machine has Optical Equipment



Hilger & Watts Machine Tool Scale and Projector, direct reading to .0001", on Ex-Cell-O Precision Boring Machine.

To provide for fast, accurate manual positioning of work for multiple precision boring operations, the Ex-Cell-O work holding fixture features Hilger & Watts optical equipment. Horizontal motion of 9" and vertical motion of 4" is shown clearly in two conveniently located screens.

Precision scales are in solid mounts and fully enclosed so that they are unaffected by coolant, dust, chips or fumes. Projection screens with their micrometers are out of the way of the workpiece, yet readily visible to the operator.

For quick positioning, optical micrometer is set to the correct thousandths and ten thousandths of inch. Slide is then manually positioned until the proper graduation appears in the screen.

As the scale is figured every .05", at least two figures are always seen. Engis Equipment Co., 431 So. Dearborn St., Chicago 5, Ill.

Use postpaid card, Circle No. 133

REPRINTS AVAILABLE

The following reprints are available from MACHINE & TOOL BLUE BOOK, 222 E. Willow Ave., Wheaton, Ill. Send for your free copy today.

1. **Flexible Reinforced Wheels**
by Richard C. Bush.
2. **New Douglas Solved Its Deep Hole Drilling Problems**
by A. R. Felando.
3. **"Bouncing Ball" Method of Indication Inspects Irregular Cam Contours.**

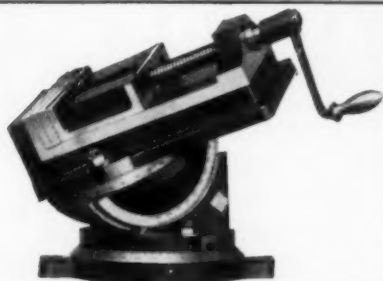
SET UP COMPOUND ANGLES INSTANTLY!

Now save valuable time on intricate, angular set-ups with the fully universal MASTER MULTI-SWIVEL VISE. Three swivels instantly set any compound angle. Used worldwide. Interchangeable platens optional.

Write for circular.

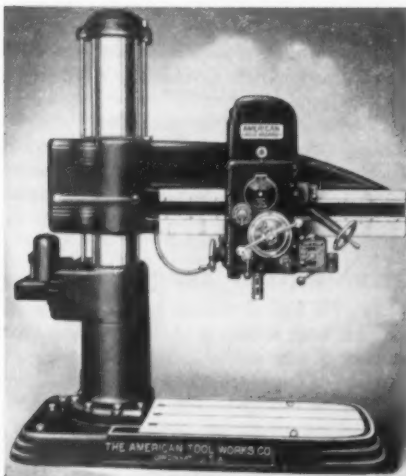
DONOVAN MFG. CO.

80 Batterymarch St. Boston 10, Mass.

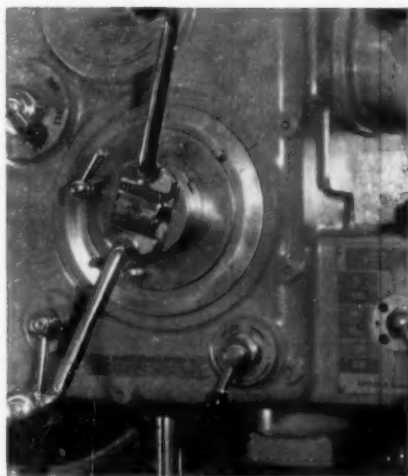


Use postpaid card. Circle No. 420

Fine Feed Boring Attachment Added to Radial Drills



DeLuxe models of the 9" and 11" column Hole Wizard radial drills offer



a fine feed boring attachment, furnished in addition to the standard feeding mechanism. The fine feed range for precision boring thus provided is one-fourth of the standard range, supplying six feeds from .001" to .00625" per revolution of the spindle.



New 1956 Model "SS" RADIUS DRESSER

Outperforms them all
Cut production time without sacrificing accuracy! Easy to set, easy to see, eliminates necessity of guard removal. Somerset Radius Dresser turns "tricky" jobs into routine operations. Write for free illustrated folder.

At new low price \$124.50 with diamond

SOMERSET TOOL CO. 244 Virginia St. Hillside, N.J.

Use postpaid card. Circle No. 421

The change from standard to fine feed range, or vice versa, is made instantly through a conveniently located lever at the side of the head.

The American Tool Wks. Co., Dept. HS, Cincinnati 2, O.

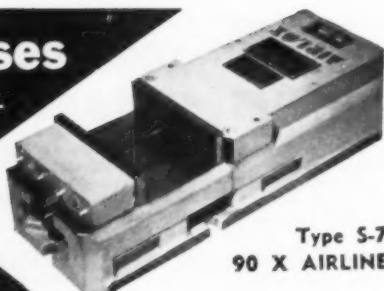
Use postpaid card. Circle No. 134

AIRLOX air vises

For Sales & S. 407, 477

— PARTICULARLY FOR MILLING —
AIR OPERATED WEDGE WITH LEVERS
DELIVERS GRIP OF 50 TO 200
X AIRLINE

PRODUCTION DEVICES, INC.
WHITEHALL, N.Y. Tel. 40.



Type S-7
70 X AIRLINE

Use postpaid card. Circle No. 422

HELIOS PRECISION DIAL CALIPER

Guaranteed Accuracy
Within .001"
Reading .001"

- **SPEED**
- **PRECISION**
- **DEPENDABILITY**

Full scale readings of 5"-
6"-8"-10" available. Also
Foot with Scriber to con-
vert to Vernier Height
Gage.

Ask for catalog and prices
of other Standard Calipers.

NEISE
MODERNTOOLS

KARL A. NEISE
404 4th Ave., Dept. MT
New York 16, N.Y.

Use postpaid card. Circle No. 423



6"
\$31.80
F.O.B. New York

Machines have fast-response circuit

A new "fast-response circuit" has been developed by Baker Brothers, Inc., Dept. JS, Toledo, O. for their automatic machine tools and plastic molding presses which utilize the Westinghouse Cypak system of machine control, with no moving parts.

Any Baker automatic machine tool or plastic molding press is available with a Cypak system, and the new circuit will be included.

Use postpaid card. Circle No. 135

Combination center drills

The Hi-Spiral center drill in both regular and arbor type is available in various diameters and lengths.

Made of high speed steel, the drill is said to be designed for maximum ease in clearing chips in order to produce superior finish and performance.

Circular Tool Co., Inc., Dept. DL, Providence, R.I.

Use postpaid card. Circle No. 136

Heavy Duty Bench Type ALLEN Punch Presses

**Powerful, Dependable
and Economical**

Many Popular Models
1 to 5 Ton Capacities
Moderate in Price

See your Supply Dealer
or write for FREE Punch
Press Catalog giving
complete information.



Model B-5
5 ton
\$199.50



Model B-2 2 ton
\$87.50 fob less motor



Special Duty 1 ton
model LTX—\$89.50



Model B-2-A
2 ton half press
\$94.50 fob

ALVA ALLEN INDUSTRIES, Dept. MTB, Clinton, Missouri

Use postpaid card. Circle No. 424

Control Panel on Automatic Die Sinker Permits Easy Three Way Operation

A fully automatic bed type die sinker of solid cast iron construction, well ribbed and reinforced to handle the heaviest cuts, is equipped with a magnetic tracer; the machine can be operated three different ways. Besides its primary function as a die sinker, it can be used as a power operated straight milling machine or as a hand operated straight milling machine.

These three methods of operation are selected on the central knob of the control panel. When on fully automatic operation the operator can set the length of stroke to cover the workpiece and select the index or pickfeed desired at the end of the cut. A second tracer control can be used for contouring.

Automatic reciprocating feeds and index are interchangeable with ram and table and can be changed to hand control by simply turning the central knob on the control panel.

As the tracer automatically coordi-



nates the vertical movement of the cutter with table and ram movements to reproduce the profile of the master model accurate, electric limit switches control adjustment of length of stroke on table and ram. Turchan Follower Machine Co., Dept. JS, 8259 Livernois Ave., Detroit 4, Mich.

Use postpaid card. Circle No. 137

DYKEM STEEL BLUE

Stops Losses

making Dies and Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead
THE DYKEM COMPANY
 2301G North 11th St. • St. Louis 6, Mo.

Use postpaid card. Circle No. 425

Solid Carbide Bore Reamer

This solid carbide bore reamer is designed to solve the problems of snaky holes, poor finishes, misalignment, and holding size. When run in a bushing, tool will bore and ream a straight hole of exacting size and superior finish all in one oper-



ation.

Dixie Tool Industries, Inc., Dept. JS,
Bridgeport, Mich.

Use postpaid card. Circle No. 138

the ONLY PORTABLE NIBBLER

that CUTS 10 Gauge Steel
Without Distortion!

A big statement... and only Fenway can make it! Our portable Nibblers have solved unusual problems for hundreds of users. Complete line includes the 14 gauge Nibbler and a light-duty 18 gauge Nibbler, and a special 90° head for each.

RCA — DU PONT —
GENERAL MOTORS —
and many others, use
Fenway Portable
Nibblers!

ALSO AVAILABLE: COR-
RUGATED, JIGSAW
ASSEMBLY & AIR TOOLS

WIRE • PHONE • WRITE
for complete information



Model HN for
10 gauge Stainless
Steel and 8 gauge
Mild Steel. 6" radius.



Model MN for 14
gauge Stainless
Steel and 13 gauge
Mild Steel. 1" radius.

Distributed by EASCO PRODUCTS

PAT. # 2278174 # 7278311 # 2335631

FENWAY

MACHINE
COMPANY INC.

Edgemont & Clementine Sts.
Philadelphia 34, Penna.

Tungsten base alloys now possible

A new field research in high temperature alloys for use in jet aircraft has been opened up by cancellation of the quota system on six critical materials: tungsten, cobalt, chromium, columbium, nickel and molybdenum. R. H. Thielemann, Director of the research program on high temperature alloys sponsored by The Tungsten Institute,

under contract with Stanford Research Institute, believes that the lifting of all restrictions on the use of tungsten in gas turbine engines will make possible the development and use of new alloys more likely to crack the heat barrier than anything currently available. He says that tungsten base alloys are now within the realm of scientific achievement.

The heat barrier, or thermal thicket,

CYCLONE SEPARATION

FOR MORE EFFICIENT
DUST COLLECTION
—FILTERS LAST LONGER



Almost all industrial dusts can be collected more efficiently by Dustkop. Thirty-seven standard models ready to use! Reduce installation costs — save space. Write for descriptive literature.

ALSO A COMPLETE LINE
OF MIST COLLECTORS

DUSTKOP®
STOPS DUST



AGET MANUFACTURING COMPANY
1402 EAST CHURCH ST., ADRIAN, MICH.

presents acute problems for aircraft designers and builders. The intense heat created by friction induced by speed causes metals to creep and to lose strength. In the case of aluminum, 40% of its strength is lost at a rate of speed twice the speed of sound. Titanium, because of intense heat created in gas turbine engines, in the future may be limited to the front sections of com-

pressors which are comparatively cold, or below 750° F.

With speeds of aircraft and the intense heat of their engines continuously on the increase, development of heat resistant or high temperature alloys for fuselage and for jet engines is one of the vital programs in aircraft planning today.

Use postpaid card. Circle No. 139

NEW
from
ELGIN

Golden Circle

SOLID CARBIDE DRILLS and REAMERS

—precision machine ground.	—complete size range in stock, specials available.	—quality proved by Elgin for accuracy and long life.
----------------------------	--	--

WRITE TODAY for details on this latest addition to Elgin's "Golden Circle" Rotary Tool Line of solid carbide burs and end mills.



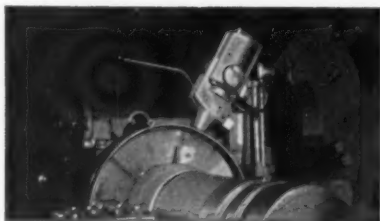
ABRASIVES DIVISION, DEPT. K
ELGIN NATIONAL WATCH COMPANY

Elgin, Illinois

Use postpaid card. Circle No. 428

MACHINE and TOOL BLUE BOOK

INCREASE PRODUCTION...



Above is shown a 6M Fen Automatic Wrench operating a 28" heavy duty chuck.

ELIMINATE "WRENCH WRESTLING"

You can put the advantages of the Fen Automatic Wrenches to your work right in your own shop on machines already in operation, or specify them on your new standard or automatic machines.

• • •
For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

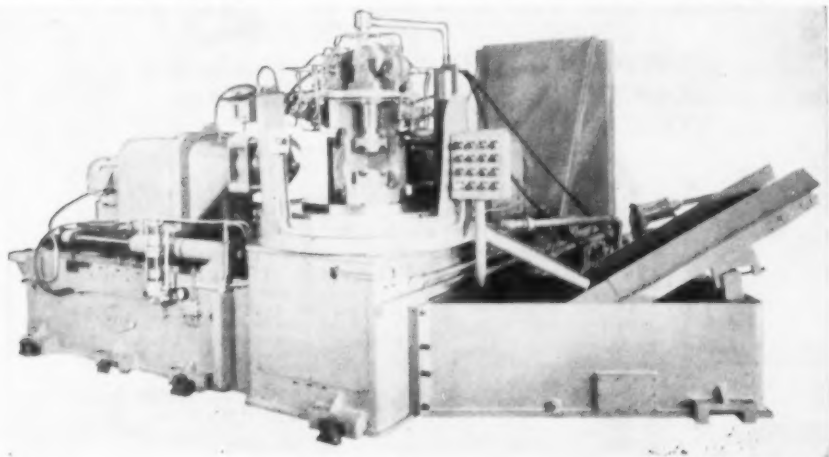
**THE FEN
MACHINE COMPANY**
28914 Lakeland Blvd.
Wickliffe, Ohio

Use postpaid card. Circle No. 429

Machine Faces and Chamfers Both Ends of Elbow

This horizontal 2-way index machine faces and chamfers both ends of a steel

elbow simultaneously. When the elbow leaves the machine, it is ready for



welding.

An electric-powered index table has two positions. For greater rigidity heads target into the fixture. Single-point carbide tools are mounted on sliding catheads which pilot from the inside diameter of the elbow.

Operation is automatic, with the operator simply loading and unloading one station. Production at 100% efficiency is 146 per hour on 1" elbows and 27

per hour on 4" size. Speed changes for different size elbows are accomplished quickly by pick-off gears on the drive bracket. Fixture jaws are replaceable for different diameter elbows.

The machine is composed of standard components that can be adapted to other uses such as boring, drilling and tapping. Complete data is available from Baker Brothers, Inc., Dept. RH, Toledo 10, O.

Use postpaid card, Circle No. 140

Johnson METAL CUTTING BAND SAWS



Model B
(Wet or Dry Models)
Cuts 5" rounds, 10" flats

- for precision
- operating ease
- economy



Model J (heavy-duty)
(Wet or Dry Models)
Cuts 10" rounds, 18" flats

THE MODERN LOW COST WAY TO CUT METAL

Johnson Metal Cutting Band Saws are fast . . . tough . . . and completely automatic in operation. Yet they COST LESS than comparative models. They'll cut anything in your stock pile safely and accurately . . . tubes, rods, angles, heavy rounds, flats, and irregular shapes, too.



GET ALL THE FACTS
Send for a Johnson catalog. See how a Johnson Saw will speed your production.

Johnson

**MANUFACTURING
CORPORATION**

1012 Barnes St.

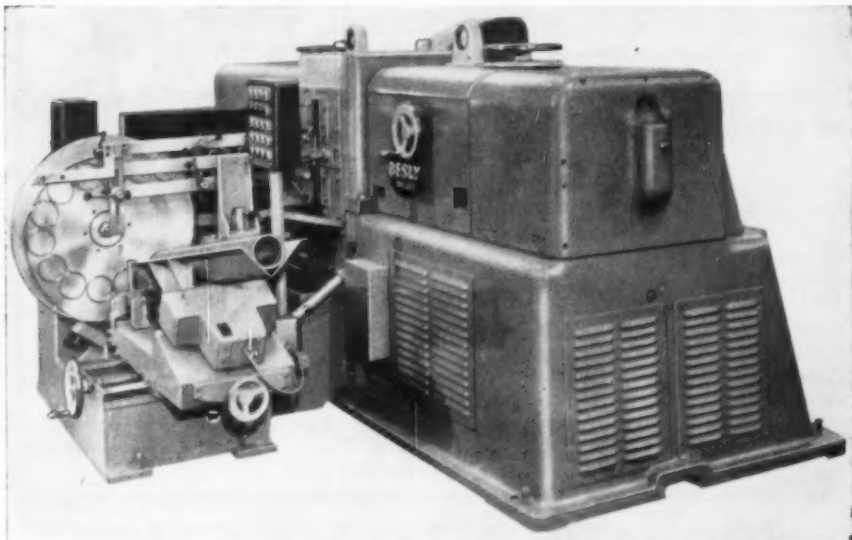
Albion, Mich.

Use postpaid card. Circle No. 430

Push-Button Grinding

The No. 240-30" Double Horizontal disc grinder has all spindle motors con-

tained within the base—with push-button controls on both sides. Machine



GRIND—RADIUS—ANGLE

QUICKLY

EASILY

RADIUS DRESSER..\$44.00

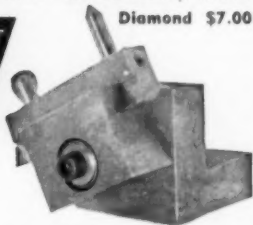
ANGLE DRESSER..\$49.00

Diamond \$7.00

Diamond \$7.00



ORDER DIRECT
on our 10 day
money back
guarantee



Chatter Resistant, Spring Loaded Spindle

Hardened shaft—bearing adjustable for wear.
Diamond always perfectly centered.
Easily set adjustable 180° stops.
CAPACITY—1½" Convex to 4" concave
10" Wheel size for DoALL and NORTON
Grinders—\$49.00. Diamond \$7.00

Ball Thrust Bearing.

24 Precision Ground Surfaces. Can be set very accurately with a Protractor or Sine Bar. Works underneath the wheel. Large bearing surfaces.

The "Mighty Midget" Line

SPERMAN METAL SPECIALTIES • 2197 E. 21st ST. • BROOKLYN 29, N. Y

is accurate (.0001" for parallelism) and practical for high speed precision finishing of piston rings, bearing rings, automatic transmission plates and similar shapes.

The Besly-Welles Corp., Dept. RB, Beloit, Wis.

Use postpaid card. Circle No. 141

Machine drills, reams, taps in large circular patterns

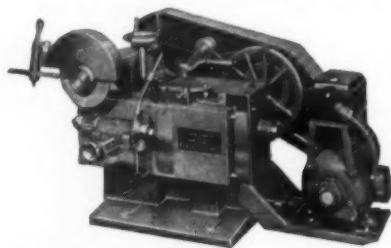
Model A-50 turret drilling machine has been designed specifically to accommodate the needs of the jet aircraft engine industry for performing consecutive drilling, reaming, counter-boring and tapping operations in large circular patterns. All operations are accomplished in one handling of the work.

The large circular table accommodates rotary fixtures up to 48" in diameter. The turret carries six spindles which work on a common axis and are indexed into position as required. Speed,



depth and reversals for tapping are preset for each spindle and repeat auto-

AUTOMATIC METAL SAW GRINDER Cuts Costs . . . Makes Money For You!



WARDWELL

3807 Ridge Road
Cleveland 9, Ohio

Maker of Largest Line of Saw and Tool Sharpening Machines

**Wardwell's "35 T" will sharpen
up to 115 saws .015 thick at
one time . . .**

This includes slitting and screw slotting saws and milling cutters. Takes saws from 2" to 5½" diameter. Completely automatic. No attention is required after machine is started. These ingenious, compact and sturdy grinders are saving and making money for their owners all over the world.

**You owe it to yourself to write for
Bulletin 35 T containing full information.**

Use postpaid card. Circle No. 432



INDUSTRIAL

GAS

EQUIPMENT

BURNERS & FURNACES (Heat Treating, Melting, Soldering)

NO BLOWER OR OTHER POWER NEEDED

... just connect to gas supply!

Outstanding service since 1911! Each unit, with the famous "BUZZER" Venturi, delivers the hottest, quickest heat attainable without a blower. Full range control of heat and turn-down. Standards or specials available for manufactured, natural or liquefied gas applications.



Bench Type Oven Furnaces



Atmospheric Pot Furnaces



Write for New
"BUZZER" Catalog.

CHARLES A. HONES, INC.

129 S. Grand Avenue, Baldwin, L. I., New York • BALDWIN 3-1110

Use postpaid card. Circle No. 433

matically as the turret is indexed.

The workpiece is loaded in a rotary fixture and indexed from one hole location to another, all necessary operations being performed at each hole location by indexing the turret.

The quill, which carries the turret, is counter-balanced for sensitivity and provides six inches of travel. Head is separately counter-balanced and adjustable through fifteen inches of travel. Howe and Fant, Inc., Dept. DR, 20 Fitch St., East Norwalk, Conn.

Use postpaid card. Circle No. 142

Drill chuck for close-quarter drilling

The Mini-Chuck produces a firm grip on full length or broken drills. Cut-back slot permits a full tension grip of the drill to prevent slippage and pullouts. The only replacement required is the drill itself.

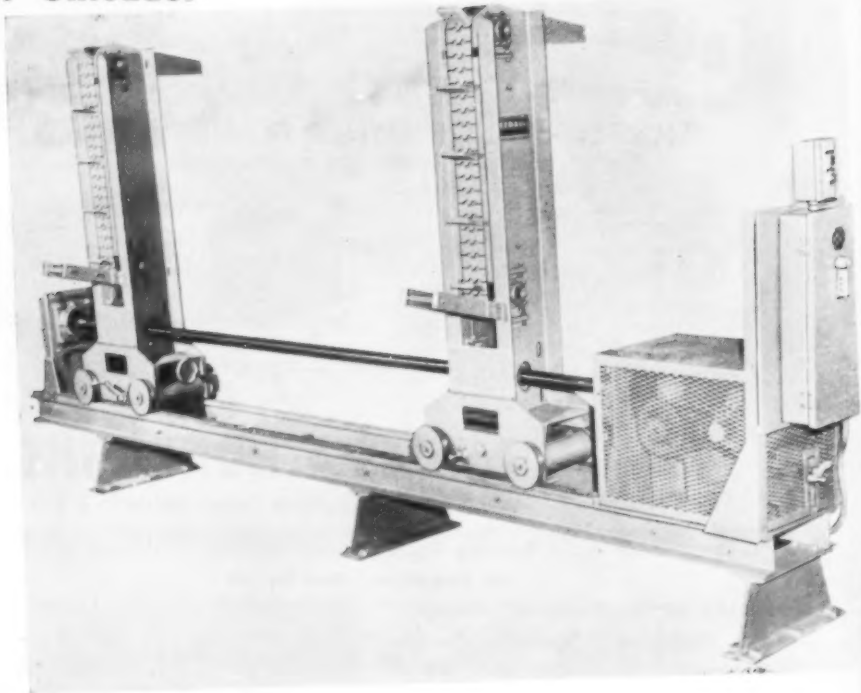


Available in a full range of chuck sizes from No. 50 to "F" with adapters to fit spindles of standard angle head and snake drills.

Beaver Tool Co., Dept. DL, Box 256, Huntington, L.I., N.Y.

Use postpaid card. Circle No. 143

Bar Unloader



This machine unloads pieces of bar or tubing from a production machine to a high tote box. It has one stationary tower and one movable elevator so that it can be adjusted to handle pieces from 3 feet to 12 feet in length and from 1½" to 3" in diameter, at a variable rate of speed.

The bar or tubing flows from the production machine into a V shaped trough which is tipped to one side as the piece leaves the machine. The piece falls down an incline until it is picked up by the cleats of the two elevating conveyors which operate in unison. It is lifted to the top of the conveyors and over to the other side of the unloading machine where it rolls into the tote box.

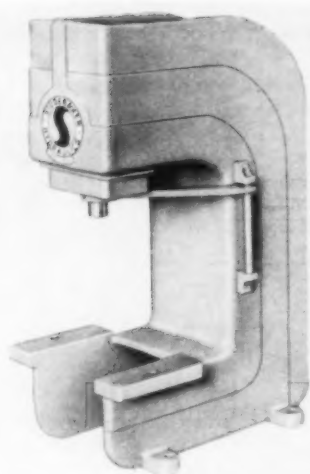
Power is furnished by a ½ hp 220/440 volt 3-phase motor operating through a square shaft which motivates both elevating conveyors. Feedall, Inc., Willoughby, O.

Use postpaid card, Circle No. 144

Air hydraulic press

The air hydraulic Speedpress was designed primarily to save compressed air. This is accomplished by the use of dual pressure booster assembly, which advances the ram to contact with work before full rated pressure is applied.

Unit has the squeeze of hydraulics and the speed of air for production assembly operations. It is recommended for light metal fabrications such as



requiring a long power stroke after tooling is in contact with the work-piece. Standard models have either a $\frac{1}{2}$ " or 1" full power stroke. Studebaker Hydraulics Products Co., Dept. RB, 1733 N. 33rd Ave., Melrose Pk., Ill.

Use postpaid card. Circle No. 145

Tapping head improved

The Tap-Tool tapping head now has an improved bearing race for longer life and smoother operation. An improved clutch has made the drive more sensitive. Changes in the shaft have resulted in greater accuracy on the smaller tap holes, with less tap breakage.

Tool was designed for sensitive, high speed tapping of 0-80 to 4-40 holes in steel. Standard model is equipped with Morse No. 2 tapered shank. Armite Laboratories, 6609 Broad St., Los Angeles 1, Calif.

Use postpaid card, Circle No. 146

crimping, staking, marking, trimming, riveting. Power unit is easily removed from press housing for maintenance.

Press is designed for operations not

Adjustable MULTI-DRILL for Production Drilling

9" DRILLING AREA
AVAILABLE WITH 2 TO 8 SPINDLES

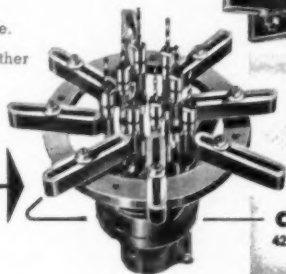
- Designed for accurate, high speed production drilling
- RUGGED CONSTRUCTION
- Quick, easy adjustments to **any** hole pattern on or within a 9" circle; $\frac{1}{4}$ " minimum center distances; Drill sizes $\frac{1}{16}$ " to $\frac{3}{8}$ "
- Special adaptations available.

MULTI-DRILLS are made in other sizes and models.

Write for details and name of your nearest Distributor.

• **Locator arms are designed for fast, easy adjustment**

Dependable Performance...
proven by industry

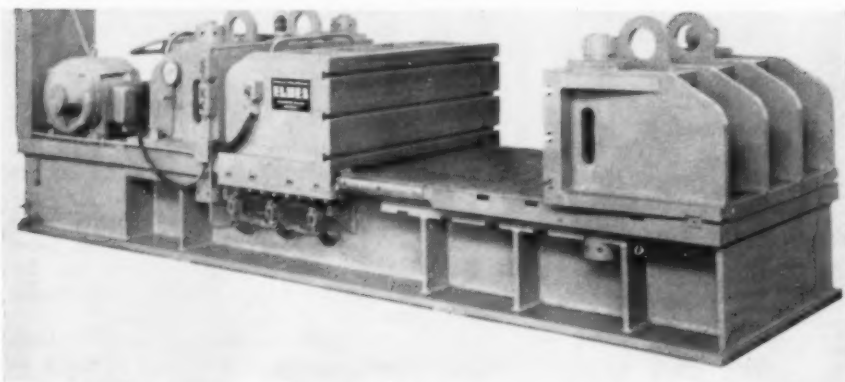


**FITS ANY
DRILL PRESS**

COMMANDER MFG. CO.
4227 W. KINZIE STREET, CHICAGO 24, ILLINOIS

Use postpaid card. Circle No. 434

Automatic Bulldozer for Heavy Bending Operations



This Elmes 200-ton hydraulic bulldozer has full electrical control, for automatic or semi-automatic operation. Designed for unusually heavy bending

operations, the unit is exceptionally large in size and extra sturdy and rugged in construction. Unit is completely self-contained, with both the

Cuts Tubing to Accurate Lengths in **-SPLIT-SECOND TIME!**

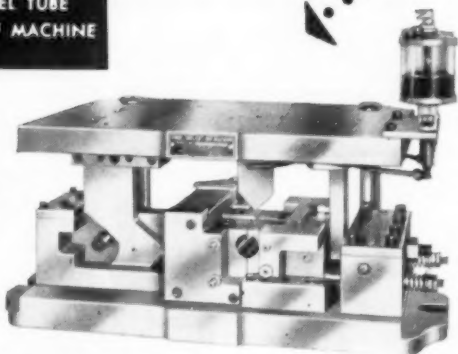
LENGTHS of $\frac{1}{2}$ inch or more are accurately cut to $\pm .010''$ with each

stroke of press—actually less than $\frac{1}{2}$ of a second or faster than any other known method. In addition to being rapid and precise, the Vogel Cut-Off also cuts clean with a minimum of burr and distortion. Many thousands of cuts can be made before shear blades require sharpening.

Unit No. 12 accommodates tubing up to $\frac{1}{2}''$ O.D. with $\frac{3}{32}''$ wall; the No. 2 takes tubing up to 2" O.D. with $\frac{1}{8}''$ wall.

Ask for sample showing how clean-cut your tubing can be sheared with this machine.

VOGEL TUBE CUT-OFF MACHINE



PATENTED

VOGEL

TOOL AND DIE CORPORATION
1825 NORTH 32nd AVENUE, MELROSE PARK, ILLINOIS

Use postpaid card. Circle No. 435

control box and the pumping unit integral with the machine.

Bed is protected by reversible hardened steel wear plates. Operation, including jogging, is by foot switch control. No pre-setting of press stroke is necessary. To change jobs the operator simply changes dies.

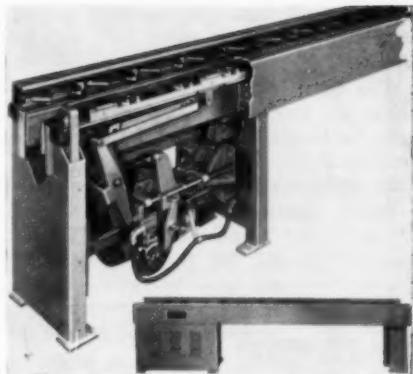
Length of machine is 17 ft. 8½ inches, width 6 ft., over-all height 4 ft. 8 inches. Opening is adjustable from 60" maximum to 12" minimum. Speeds in inches per minute: advance 140, press 41, return 285.

American Steel Foundries, Elmes Engineering Div., 1150-H Tennessee Ave., Cincinnati 29, O.

Use postpaid card. Circle No. 147

In-line transfer table

This in-line transfer table, without fixtures, transfers piece parts from station to station for automatic or manual operations. It can be adapted to mul-

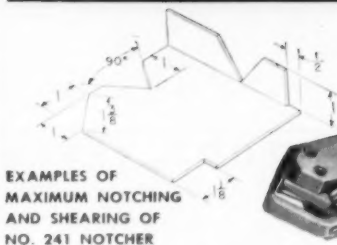


tiples, consecutive operations and will handle 6400 pieces per hour.

Designed for piece parts which have a flat surface on which to slide along a track from station to station, the table will cam lock piece parts at each station within .005" tolerance without auxiliary locating devices. When toler-

EASY - WORKING, POWERFUL

WHITNEY-JENSEN No. 241 HAND NOTCHER



WEIGHT
7 LBS.

LENGTH OVERALL 21"

CAPACITY
16 Ga. Mild Steel

WHITNEY METAL TOOL CO.

718 FORBES ST., ROCKFORD, ILL. Since 1910

Useful for a lot of different notching operations, as shown by examples of side, corner, and flange cuts. Very efficient on corner moulding, also shallow sheet metal channels. The curved blade hooks to a point that will engage a punch prick for exact location of notch.

ance is less than .005", a shot pin or locating lug on the piece part can be utilized.

The base support of the table contains an intermittent drive unit and may be located at either end or in the middle of the table to suit the production requirements.

Index distance can be varied from 3" to 9" and index time from 25 to .7 seconds. Since the inertia loads are

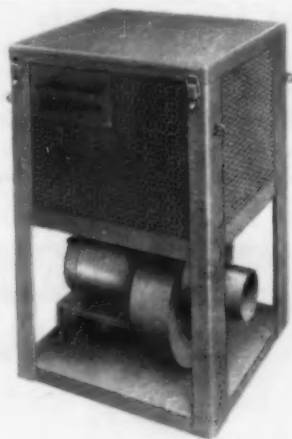
low, fast indexing can be accomplished quietly and efficiently with a total cycle time from .56 seconds. The dwell time is adjustable.

Tables are available in lengths from 5 to 12 feet. Longer tables are available if required.

Dixon Automatic Tool, Inc., Dept. RB,
2300 Twenty-third Ave., Rockford, Ill.
Use postpaid card. Circle No. 148

Mist collector

A compact unit that captures fog, smog and mist from surface, cylindrical and thread grinders, lathes, screw machines, and other machine tools using cutting oils, the Hammond MistKolector,





**Handle your small
part precision
JIG BORING
on the
LINLEY
JIG BORER**

Why tie up your big, costly jig borers on small work when you can get maximum utility at less cost per hour on a machine exactly fitted to your work. Put your small work on the LINLEY where it belongs and reserve your large machines for large work, where large work belongs. You'll save money this way.

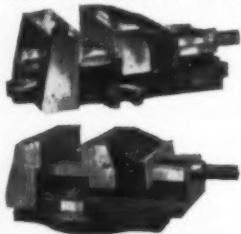
SPECIFICATIONS:
Table Movement: 6"x10"
Table Size: 7"x17½"

Complete details sent promptly on request

LINLEY BROTHERS CO.
663 State St. Ext., Bridgeport 1, Conn.

Use postpaid card. Circle No. 437

IMPROVED MACHINE TOOL VISES



DRILL PRESS VISE (Size No's. 1 & 2)

Designed for heavy duty drill press and milling machine work. Has lugs cast solid on both sides and ends for bolting to machine table.
(Size No. 1—6" jaws, 1½" deep, opens 5". Price \$69.00)
(Size No. 2—10" jaws, 2¼" deep, opens 8½". Price \$99.50)

MILLING MACHINE VISE with Graduated Swivel Base (No's. 10 & 20)

Has a graduated swivel base, held in place by a center pin and two bolts. Tongue in base can be of any size desired.
Size No. 10—6" jaws, 1½" deep, opens 5". Price \$99.50.
Size No. 20—10" jaws, 2¼" deep, opens 8½". Price \$135.00.

Dealer's inquiries invited—All prices Net F.O.B. Chicago

Write for descriptive literature.

**J. E. PLUNKET MACHINE CO. 3230 ARCHER AVE.
CHICAGO 8, ILL.**

Use postpaid card. Circle No. 438

is offered in two models and in four motor sizes, with volume ranging from 525 to 2685 cubic feet per minute and motor hp from ½ to 5.

Filter needs replacing only when suction loss is noted at the hood or vapor is discharging through the filter. Replacement is simple; only a sheet metal cover must be removed.

Hammond Machinery Builders, Inc.,
1614 Douglas Ave., Kalamazoo, Mich.

Use postpaid card. Circle No. 149

BARKER Bench Type Mill

for Production Milling
of small parts by
Unskilled
Help

\$295.00

As Shown



Screw Feeds
Optional

at Extra
Cost.

Write for
Details

**BARKER
ENGINEERING
COMPANY**

500 GREEN RD., CLEVELAND 21, OHIO

Use postpaid card. Circle No. 439

MINIATURE DRILL BUSHINGS

Hole Sizes—No. 80 to 3/32"

O.D. 3/32" to 13/64"

Lengths 1/4" to 3/4"

.0002 Tolerance on I.D.,

O.D., and Concentricity

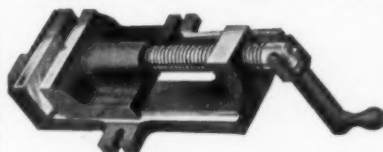
WRITE FOR CATALOG

PREBCO BUSHING CO.

14702 East Arrow Highway
Baldwin Park, California

Use postpaid card. Circle No. 440

YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, inches	Opens inches	Weight Pounds
1D	3½	4	12½
2D	5	5½	23

Do you need a vise of ANY type?

Write today for bulletins on
the extensive Yost line

YOST MFG. COMPANY

124 GRANT STREET

CAMBRIDGE SPRINGS, PA.

Use postpaid card. Circle No. 441

Plain Type

CLOSED

TRADE

AUTOM

MARK

CLOSED

Offset Type

CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS
OFFSET

**AUTO MOULDING
& MFG. CO.**

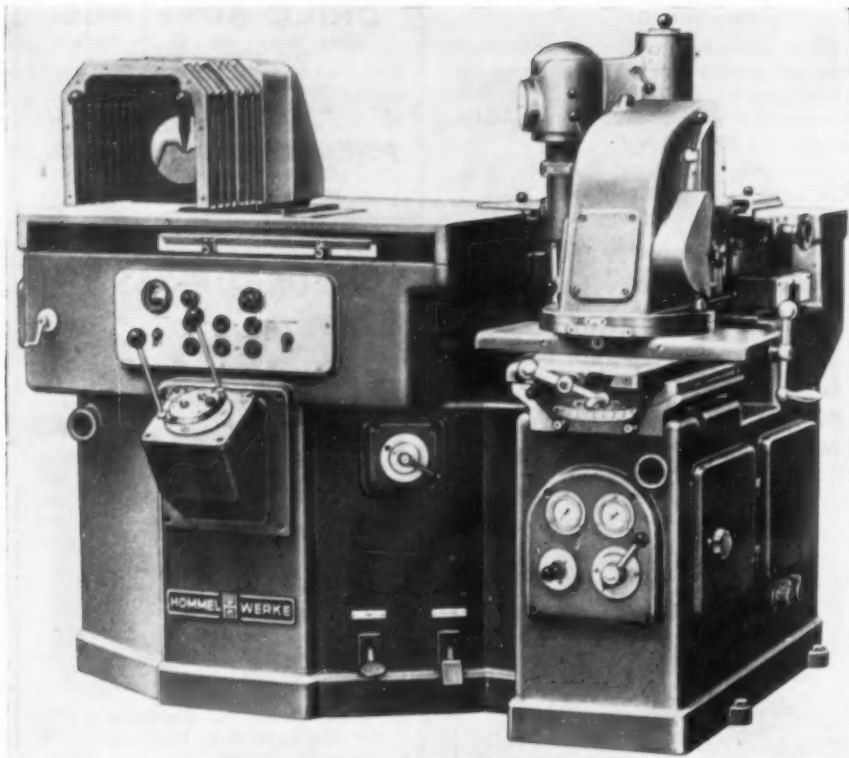
1110 E. 87TH ST.
CHICAGO 19, ILL.

Use postpaid card. Circle No. 442

SPECIFICATIONS
Open width 7/8" to 6"
Gage Material .040 to .125
Pin Diameter .101 to 3/8"
Lengths to 120"

SEMI-OFFSET

Optical Profile Grinder



German-made Hommel OPSM optical profile grinder may be used to grind profile gages, circular form tools, straight

form tools, press tool punches, etc.

The desired profile is drawn with Indian ink on transparent plastic sheet

INSTANT ACTION RAPIDSET

by HARTMANN

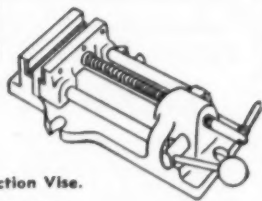
All Purpose Tool Room and Machine Shop Vises.

The JAWSET

Adjustable Pressure Production Vise.

For Information Write Dept. M

Hartmann Mfg. Co., 1637 Goold St., Racine, Wisconsin



in the selected enlarged scale (between 10:1 and 50:1). This drawing is placed on the projection table and the work is ground to it. The projection screen shows: (1) a portion of the profile drawing; (2) corresponding section of the work piece; (3) the cutting edge of the grinding wheel.

By means of the two control levers the projection table, with the drawing, is moved hydraulically, the outline of the profile being guided so that it maintains contact with the image of the grinding wheel, which serves as a guide finger. The movement of the projection table is transmitted to the work table through a lever system. The ratio is set by means of gage blocks.

Aaron Machinery Co., Inc., Dept. DL,
45 Crosby St., New York 12, N.Y.

Use postpaid card. Circle No. 150

.0003 HOLE LOCATION IN 1 MINUTE

EDGE FINDERS

\$2.50
NEW

POSTPAID
except C.O.D.

\$10.00
DELUXE



• Thousands have proven and accepted the Deluxe Model for years.

• Jumps sideways as shown when location is reached.

• New .500 dia. Model for larger work only.

.200 Dia.



ADJUSTABLE VISE STOP



\$2.95

Hundreds Of Places To A .0003 Tolerance With This Hardened Vise Stop That Is Adjustable In All Directions. Attach To Vise With One 1/4-20 Tapped Hole.

Dealer Inquiries Invited

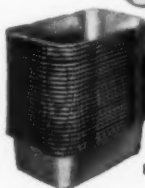
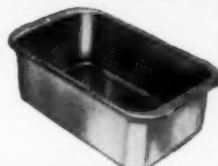
GLOVER MFG. CO.
422 Park Ave. Meadville, Penna.

Use postpaid card. Circle No. 444

"PAK-N-STAK"

Bathey

Leak proof drawn steel.
Most economical pan
offered to industry



Length 18 1/2"
Width 11"
Depth 5 1/2"

Nested



Stacked

Dealers in principal cities.

Write for catalogue



BATHEY MFG. CO.

100 SO. MILL ST.

PLYMOUTH MICH.

Use postpaid card. Circle No. 445

MORRISON 1" AUTOMATIC KEYSEATER

Investigate the many features of this new Keyseater.

It has automatic feed, automatic stop to cut off feed at given depth, automatic relief to back the work away from the cutter, automatic centering, automatic lubrication and no bushings required.

Write for more information on the finest Keyseater on the market.

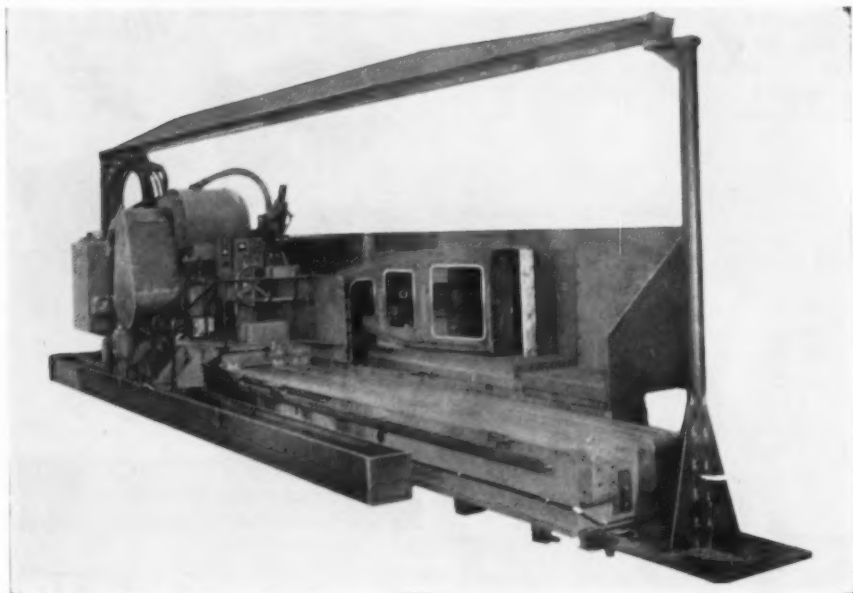


THE D. C. MORRISON CO.

P. O. BOX 1017C • CINCINNATI 1, OHIO

Use postpaid card. Circle No. 446

Traveling Wheel Face Grinder Redesigned



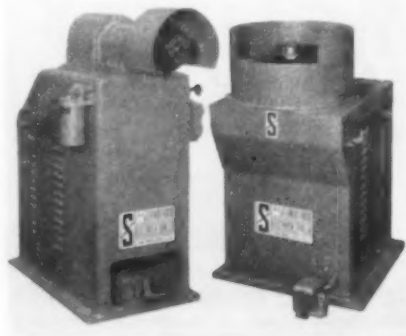
Precision grinding of long or bulky workpieces at 90° to the wheel face can be accomplished by a Mattison UK traveling wheel face grinder. Machines have been improved to provide greater horsepower for heavier stock removal and a heavier carriage for greater precision.

In operation, the part, no matter how large, is clamped in a stationary position and the grinding wheel passes over the surface to be ground. The stationary table permits the use of fixtures and clamps just as heavy as the work demands. There is little likelihood of the piece tearing loose. Work of almost any length can be ground, because one end is supported by the table and the other end by supplemental blocking. Mattison Machine Works, 545 Blackhawk Park Ave., Rockford, Ill.

Use postpaid card, Circle No. 151

Speed lathes

Type CP (vertical) and Type CSL (horizontal) speed chucking lathes can be supplied with single, multiple and variable speed motors, as well as electric brake motors for starting and stop-



ping the machines a number of times every minute.

Various makes of hand or air chucks can be arranged for or supplied with the machines. Spindle speeds can be furnished to suit the application.

Various operations can be accomplished: deburring, polishing, blending, etc.

The Standard Electrical Tool Co., 2486 River Rd., Cincinnati 4, O.

Use postpaid card. Circle No. 153

Electric furnace plant opened

A new industry was officially opened Dec. 10 at Huntsville, Ala., when Norton Co. dedicated its recently completed electric furnace plant at ceremonies commencing a two-day Open House Program.

The plant will manufacture a variety of electric furnace materials including boron carbide, fused zirconia, fused magnesium oxide, and fused alumina. These materials are becoming increasingly important to American industry because of their ability to withstand extremely high temperatures and wear. Boron carbide has several applications in the field of atomic energy.

At a later date, facilities for making aluminum oxide and silicon carbide may be added. These materials are used in making abrasive products and high temperature refractory materials.

Edward D. Porter is resident manager of the Huntsville plant which, at the present time, employs about 60 people. The plant is operated by the company's Electro-Chemical Div., headed by Howard J. Daly, vice-president and general manager. Charles H. Strasser is manager of manufacturing of the division.

Use postpaid card. Circle No. 152

January, 1957



Simply turn the MICRO ADJUSTING SCREW

OSLUND MICRO ADJUSTING INDICATOR HOLDER

saves a great amount of set up time. It is equipped with two thumb screws. One of these is a lock screw. You loosen this screw, move clamp until indicator is in approximate position, then tighten. For final adjustment, simply turn the second screw, the Micro Adjusting Screw, until the indicator pointer reaches desired position.

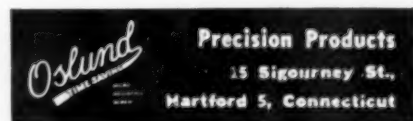
The Oslund Holder can be used in three positions:

1. with the Holder set in normal position, it will indicate from dead center to approximately 2" diameter.
2. by a simple turn of the Holder Swivel Clamp you can indicate up to 5" diameter.
3. by application of the extension bar you can indicate up to 15" diameter.

This Holder was originally designed to be used with the Oslund Universal Indicator as this indicator has a 360° reading face which eliminates walking around the machine or using a mirror.

Whereas the Oslund Holder is most outstanding on our own Indicator, it can be used on the Federal Test Master and Standard Gage Check Master as well. Adapter for Last Word Indicator available from stock. We can also make this Oslund Holder to fit all types of other Indicators.

DEALERS: TERRITORIES AVAILABLE



Use postpaid card. Circle No. 447

295

SPACE SAVERS

RACKS FOR ALL BAR STOCKS



Keep your bar stock within easy reach and conserve 75% of your storage space. Eliminate handling accidents. YOHE racks placed back to back increase storage efficiency. Stock always visible. Write for literature and prices today. . . .

THE YOHE SUPPLY CO.

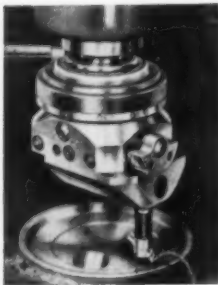
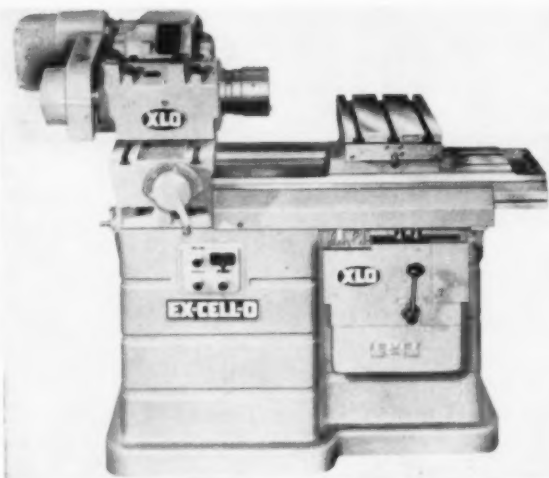
P.O. Box 708

Canton 1, Ohio

Use postpaid card. Circle No. 448

Production Machine Adaptable to Toolroom Use

Style 2112-B precision boring machine can also be arranged to handle a wide variety of toolroom and short production runs. This flexibility is made possible with selective cycle equipment, a variable speed drive, and a universal fixture. The horizontal slide of the fixture is operated manually or hydraulically to suit the particular kind of work being done. A vertical slide (not shown) can be mounted parallel, or at right angles to the spindle,



DO YOU SAVE MONEY with several Accuracy jeopardizing set-ups when one set-up could do your work?

We think not!

BUT:

With our **WOHLHAUPTER MASTERHEAD** IN ONE SET-UP you do boring, facing, recessing, undercutting, turning, etc. on ONE machine and • Save considerable time • Increase production • Increase efficiency • Utilize your present machine park more economically.

9 models of the **WOHLHAUPTER MASTERHEAD** available with capacities up to 31 1/2".

All models have automatic feed and automatic end release.

Multiple feed models have 12 slide feeds.

Also Automatic Tapercutting Heads for Angles 0-180°, Inside and Outside

KARL A. NEISE 404 4th Ave., Dept. MT
New York 16, N.Y.

**NEISE
MODERNTOOLS**

Use postpaid card. Circle No. 449

further adding to the setup flexibility possible to the machine. Changeovers from one job to another are quickly accomplished.

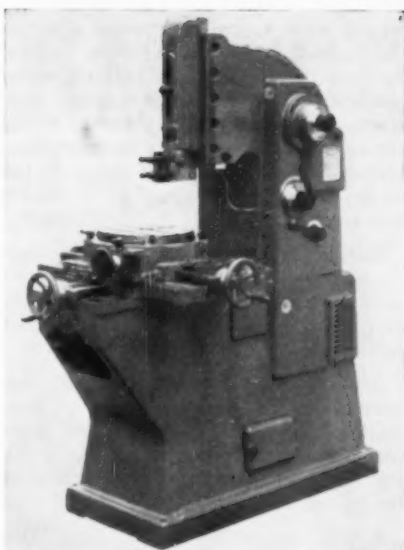
With parts mounted on the cross slide, tools are carried by one or more rotating spindles according to the need. Small parts can also be rotated on the spindles while the tools are statically supported on the cross slide.

Maximum table travel, 12"; table feeds, $\frac{1}{2}$ " to 130" per minute; rapid traverse of 38 feet per minute. Ex-Cell-O Corp., Dept. JS, 1200 Oakman Blvd., Detroit 32, Mich.

Use postpaid card, Circle No. 154

Vertical shaper has built-in rotary table

The Chomienne 5" vertical shaper, a French import, is designed for tool-room work and for short production runs of parts requiring machining of regular or irregular internal or external contours in a single setup.



The machine provides 11½" longitudinal and transverse carriage move-

Labor Saving Production CHUCK

Will pay for itself in 60 to 90 days

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days. Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.

Write for bulletin 201 today.

Top
Jaws
open



Hand lever
closes and locks
while lathe is
running.



Jaws locked



CHUCK DIVISION
THOMAS HOIST CO.
26 S. HOYNE CHICAGO 12, ILL.

Use postpaid card, Circle No. 450

ments, plus rotary movement through the built-in 12½" rotary table. Lateral movements are obtained by handwheel operated accurate lead screws, with worm and worm gear movement of the rotary table. Ram stroke is adjustable up to 5". Accelerated ram speed on the return stroke is obtained by a rocker arm in the ram drive.

Shaper is driven through multiple V-belt drive from a 2 hp motor completely enclosed in the base. The motor also drives the oil pump which automatically lubricates all moving parts.

All controls for selection of ram speeds, length of stroke, rate of longitudinal power feed, starting and stopping the motor and applying the brake are centralized within easy reach of the operator.

Austin Industrial Corp., Dept. DL,
76 Mamaroneck Ave., White Plains, N.Y.

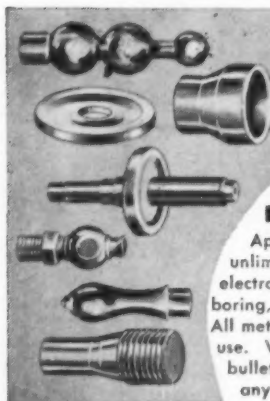
Use postpaid card. Circle No. 155

Cutter grinder

Pear cutter grinder Model 3/ZN, universal type, has a built-in ¼ hp electric



Amazing tool does CONTOUR TRACING on BORING MILLS and PRECISION DUPLICATING on Lathes or Planers

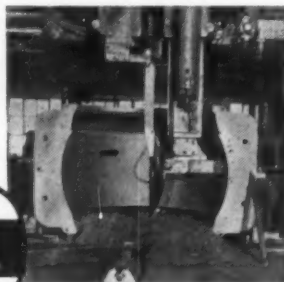


**FULL COST
LESS THAN \$1000**

Application and uses are practically unlimited. No complicated hydraulic or electronic controls. Does facing, grinding, boring, steps, threading—unlimited radii. All metals. Thousands in long, satisfactory use. Write for illustrated engineering bulletins and experienced assistance on any duplicating problem—anywhere!

★ Some territory still available for qualified representatives.

Use postpaid card. Circle No. 451



Tolerance of $\pm .002$ is maintained by Lehigh TRACER-TOOL in boring this huge water-cooled bearing housing and machining the inner bearing. TRACER-TOOL can be removed from boring mill and be in operation on a lathe or planer in less than one hour.

FRED H. SCHONBERGER, Inc.
P. O. Box 233
Nazareth, Penna.
National Distributors

motor and other standard equipment. This versatile cutter can be used to grind tapered shank cutters.

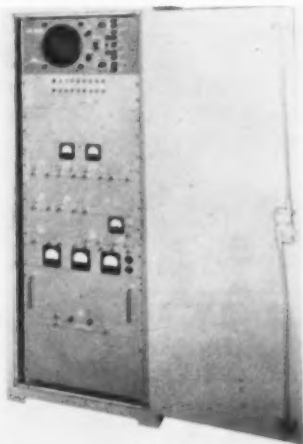
Distributed by Aaron Machinery Co., Inc., Dept. RS, 45 Crosby St., New York 12, N. Y.

Use postpaid card, Circle No. 136

High speed duplicator

A line of electronic-hydraulic tracer control machines, E-Series Duplimatics, traces at speeds required by the air-frame industry. Two and three feed tracers and remote control rise and fall tracers are available. The three feed tracer accomplishes plane and depth control with a single probe.

The only limit of speed lies in the natural frequency of the machine tool itself. Duplicator allows tracing within full range of the machine tool. Conventional operation is not restricted, use of all conventional controls is accomplished by automatic push button interchange. Equipment can be supplied



on new machine tools or be installed on existing machines in the field.

Tracer Control Co., Dept. JS, 595 E. Ten Mile Rd., Hazel Park, Mich.

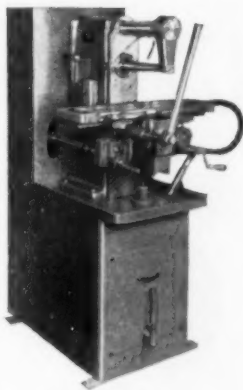
Use postpaid card, Circle No. 137

VERSATILITY

HORIZONTAL

Tool Room—
Production

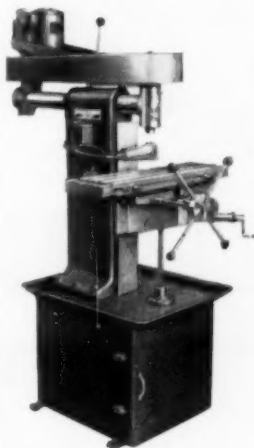
Precision built—
Hand scraped and
flaked ways • Ta-
pered gib • $5\frac{1}{2}$ "
x 24" table •
power or air to
table • Lead
screw and rack
on the same mill
• No. 10 B&S
Taper • 1" arbor
• 2 HP Motor • $8\frac{1}{2}$ " x 28" table available.



VERTICAL

Production—
Tool Room

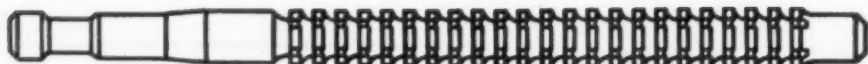
$8\frac{1}{2}$ " x 28" Table
with air or power
feed • Tolerances
within .0005" •
Exclusive screw
type rack w/ Ex-
centro gear ad-
justment. • Head
w/ or w/o quill
travel • Screw
feed available.



PRICES START AT \$880.00

CROWNINGSHIELD - HARRIS CO.
711 COUNTRY CLUB RD. EST. 1906
GREENFIELD, MASSACHUSETTS

Use postpaid card, Circle No. 452



BROACHES & FIXTURES

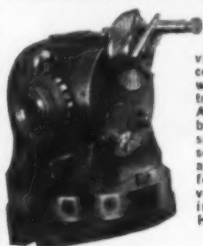
Conant offers complete engineering and manufacturing facilities for your broaching needs. Expertly designed for proper strength and chip carrying capacity. Prompt broach sharpening and reconditioning service. Order standard keyway broaches from our stock. Your inquiry invited. Send us part prints for recommendation and quotation.

Conant Broach Company
347 W. 107th St.
CHICAGO, ILLINOIS



Use postpaid card. Circle No. 453

UNIVERSAL DIVIDING HEADS



Precision built to meet every requirement. Carroll Dividing Heads are the accepted standard in metal-working plants from coast to coast.

A unique optional swivel base makes possible speedy and accurate work settings to compound angles. This and other features convert a conventional Dividing Head into a Universal Work Head or Rotary Table.

Write for 8 page catalog giving complete details, etc.



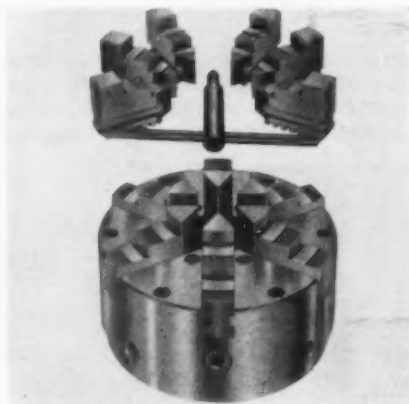
16" - 12" Universal Right or Left Hand Dividing Heads with or without Direct Indexing.

CARROLL DIVIDING HEAD CO.
3525 Cardiff Ave. • Cincinnati 9, Ohio

Use postpaid card. Circle No. 454

Chuck line expanded

Ajust-Tru chucks, three- and six-jaw models, of 8", 10", and 12" diameter have been announced by the Buck Tool Co., Dept HS, Kalamazoo, Mich. Previously the largest size universal Ajust-



ROTARY BUSHINGS FOR DRILLING, CORE DRILLING ROUGH AND FINISHED BORING

The inner race of the GATCO bushing rotates with the tool, piloting and tool accurately below or above the work—or both. Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

Write for full information and prices

ROTARY BUSHINGS

4234 ANN ARBOR ROAD, U.S. 12, PLYMOUTH, MICH.
Telephone PLYMOUTH 1472

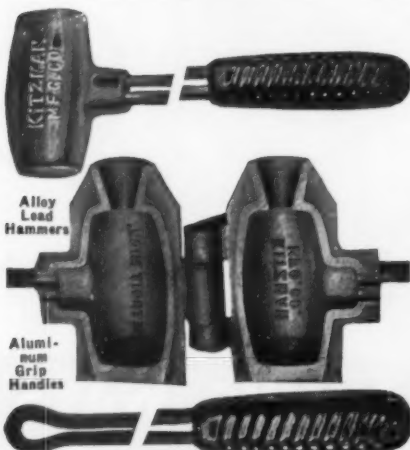
Use postpaid card. Circle No. 455

Tru chuck was of 9" diameter.

The large chucks provide all the features of the smaller sizes: adjustment to dead true within a minute, guaranteed precision within .0005" chucking duplicate pieces, automatic take-up for wear, and surer grip with less distortion by the six-jaw models.

Buck Tool Co., Dept. HS, 2015 Schippers Lane, Kalamazoo, Mich.

Use postpaid card. Circle No. 158



Hinged Hammer Moulds
1, 2½ and 5 lb. sizes—order your alloy lead hammer requirements from your machine tool supply house

or direct from:

KITZMAN MFG. CO.

15061 Hartwell Ave. Detroit 27, Mich.

Use postpaid card. Circle No. 456



SPELLMACO "SPOTTERS"

A matched set of transfer punches for toolmakers, machinists & tool cribs

Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes 3/32" to 1/2", by 1/64"—plus handy 17/64" size. Length 4 7/8". ONLY \$17.90.
Single sizes available

R. L. SPELLMAN CO.

— URBANA, OHIO

Use postpaid card. Circle No. 458

Basic cross feed faces rear axle housings

This machine makes an even cut entirely across the face of a rear axle housing. On loading, a hydraulic clamping fixture grips the two ends of the housing. Next a gage on the fixture swings out over the center of the housing to locate the center. Then a jack raises the center of the housing to the

ALL in ONE TOOLHEAD



BORING
FACING
TURNING
GROOVING
UNDER-
CUTTING

SIX SIZES
AVAILABLE

All Have Power Feed for Facing

Write today for complete details.

CHANDLER TOOL CO.

Muncie, Indiana



Model "D"

COMBINED BORING & FACING TOOL HEADS
Chandler-Duplex

Use postpaid card. Circle No. 457

gage. Before the facing operation begins, the gage swings out of the way.

The manufacturer reports 34.2 housings per hour at 100% efficiency. Fixture handles four different size housings. Tooling is a standard cross feed facing head.

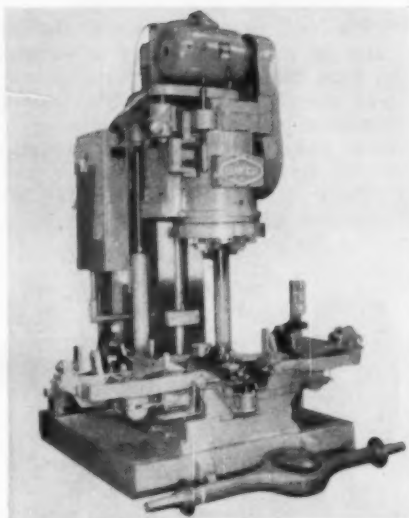
Machine can be adapted to other uses such as boring, drilling and tapping, simply by changing heads. Baker Brothers, Inc., Dept. RH, Toledo 10, O.

Use postpaid card. Circle No. 159

18% tungsten drills

Qualicut 18% tungsten high speed drills are double heat-treated to secure hardness without brittleness, to withstand greater torque and strain without breaking. Maximum land relief is given to each drill, so that it is less likely to bind and break. All drills have flutes ground and polished to an extremely fine micro-finish.

Air Transport Equipment, Inc., Dept.



DL, Box 1, N. Albany Ave., Amityville, L.I., N.Y.

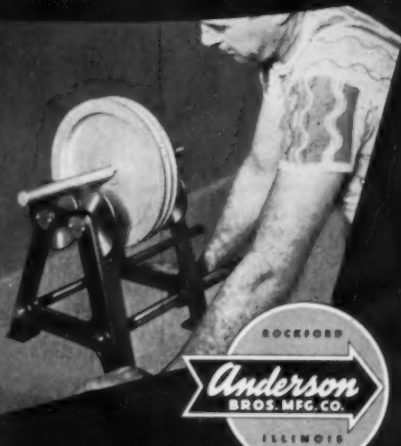
Use postpaid card. Circle No. 160

PRECISION BALANCING WAYS

Save Time . . . Cut Cost

Balance rotating parts easier, faster, more accurately with supersensitive Anderson Balancing Ways. No setup, no leveling, no centering. Chilled iron discs, ground and balanced to extreme accuracy, rotate with minimum friction on special bearings. Glass-hard spindles and bearings prevent wear or ball-bearing indentations when balancing heavy weights. Superior accuracy lasts throughout long life. Proved and preferred over 40 years. Write for bulletin 1-5.

Swing	Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000



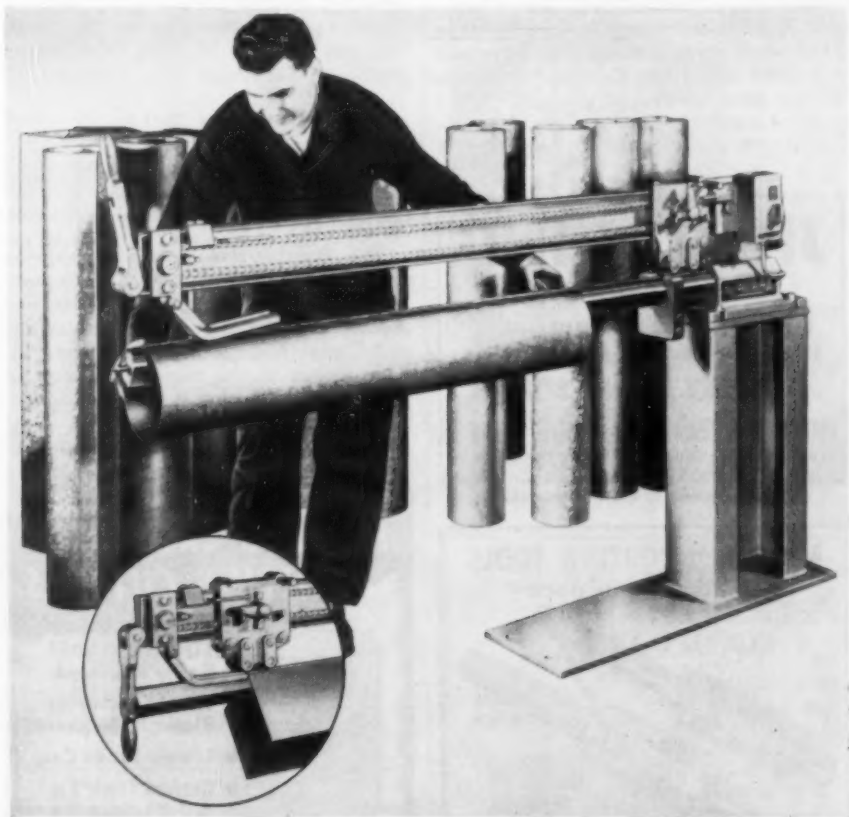
ANDERSON BROS. MFG. CO., ROCKFORD, ILLINOIS

Use postpaid card. Circle No. 459

Groover Modernized

Furnished as standard equipment, the newly-designed horn of universal power

grooving machine Model 48-V can be easily rotated and locked in any one



GEARS

In Stock—Immediate Delivery

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

Send for Complete Catalog No. 18
CHICAGO GEAR WORKS
440-50 N. Oakley Blvd., Chicago 12, Ill.

Use postpaid card. Circle No. 460



NEW NESTING TYPE

TOTE PANS

Sturdy 16 ga. metal.
20" long x 12" wide
x 6 1/4" deep. Drag
holes and handles at
both ends.

J. L. LUCAS & SON, INC.
Bridgeport 5, Conn.

Use postpaid card. Circle No. 461

of several positions for closing single lock seams on inside or outside of square and round work or Pittsburgh lock seams on square work.

Machine is driven by a direct connected gearhead motor. Adjustable stops hold work stationary on the horn and adjusting wheels enable close regulation of roll pressure to conform with thickness of material. With a nominal working length of 48", machine has a single

lock seaming capacity of 20 gauge mild steel and a Pittsburgh lock seaming capacity of 18 gauge mild steel.

Line of Giant power groovers has working lengths from 4 to 10 feet for handling mild steel up to 16 gauge. Niagara Machine & Tool Wks., Dept. RH, 683 Northland Ave., Buffalo 11, N.Y.

Use postpaid card. Circle No. 161

JIG BORING

and

**Large Precision Machining
Done to your specifications**

WE HAVE 21 JIG BORERS

KIDDE PRECISION TOOL CORP.

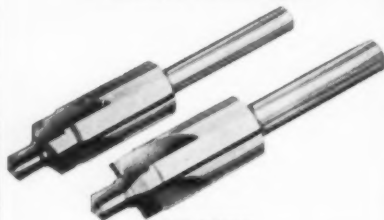
25 LOCUST AVE.

ROSELAND, N.J.

Use postpaid card. Circle No. 462

NOW . . . PORTING TOOLS

AVAILABLE FROM STOCK



AND-10050

A complete line of carbide tipped combination ream, counterbore and facing tools to form AND-10050 standards. Tube sizes 2 through 24 in turret lathe and drill press types. Special tools made to order.

Send for valuable data sheet

WETMORE TOOL & ENG. CO.

Engineers Designers Manufacturers

5318 E. Washington Blvd.

Los Angeles 22, Calif.

AN 9-7266

Use postpaid card. Circle No. 463

Accessory increases hole-location gage capacity

The Booster-Bar permits measuring greater center distances with Center-Mike hole location gages. There is a Booster-Bar for each of the three standard Center-Mike sizes. The largest adds nine inches to the measuring range of the A12 gage, raising it from 12.4 inches to 21.4 inches.

Each assembly has two precise-length rods held in plastic brackets that are

HOWALD CARBIDE MILLING CUTTERS



PATENTED
END MILL

- SQUARE BLADES
Easily Replaced.
- Simple, Accurate
Blade Adjustment.
- Lowest Blade Cost.
- Cutters from 1½"
to 14" dia.



PAT.
SHELL
MILL

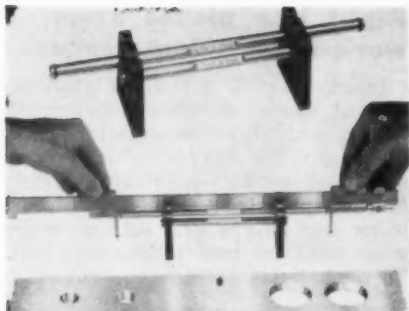
SEND FOR BULLETIN

**W. T. HOWALD
MACHINE WORKS**

182 SIGOURNEY ST., BROOKLYN 31, N. Y.

Use postpaid card. Circle No. 464

MACHINE and TOOL BLUE BOOK



slotted to hold the Center-Mike when measuring.

The two rods—one long and one short—give coverage for all combinations of hole diameters and center-spacing, from the normal range limit of the gage alone to the extended range limit supplied by the accessory. Sorensen Center-Mikes, Inc., Dept. DR, 264 Kossuth St., Bridgeport 8, Conn.

Use postpaid card, Circle No. 162

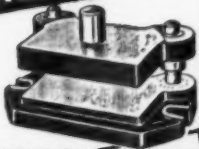
THREAD GRINDING AND PRECISION MACHINING

**WARD THREAD
GRINDING COMPANY**
265 Howard Ave. Bridgeport, Conn.

Use postpaid card, Circle No. 465

DANNEMAN *Precision* DIE-SETS

**Precision-Bored
on Master Plates**



DANNEMAN DIE-SET DIVISION
ACME-DANNEMAN COMPANY, Inc.
201 Lafayette St. New York 12, N. Y.

CATALOG
ON REQUEST

Use postpaid card, Circle No. 466

January, 1957

**Here's
the
dope!**

TAMMS
**BLUE
LAYOUT
DOPE**

TAMMS INDUSTRIES, INC.
228 N. La Salle St., Chicago 1, Ill.

**WRITE
for
SAMPLE**

**DRYS FAST-RESISTS OIL
WON'T CHIP, CRACK OR FLAKE OFF!**

Use postpaid card, Circle No. 467

SHARP NAMEPLATE MARKING

Model
No. 4



The nameplate on your product is your signature. Keep it neat and legible! Accurate location and alignment are assured with this

NAMEPLATE DETAIL PRESS

- Simple Operation
- Perfect Alignment
- Uniform Depth

GEO. T. SCHMIDT, INC.
1802 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS

Use postpaid card, Circle No. 468

TROYKE

WORM WHEEL OPERATED ROTARY TABLES

PRECISION GROUND TABLES AT
THE LOWEST PRICES



A size and type to meet your requirement.

For complete information and prices write for Free Catalog No. 22.



TROYKE MFG. CO.

11290 Orchard Street
Cincinnati 41 (Sharonville), Ohio
Use postpaid card. Circle No. 469

Try this Allman Universal Hand Tapper FREE for 15 days—

Results have proved that once this tapper is in your shop or tool-room and you find 70% of your free hand tapping time saved—
It will stay there!
The new Allman hand tapper has these advantages:

- Articulate arm swings clear of large table for placement of work.
- Limitless number and sizes of tapped holes without moving work piece.
- Vise holds work as small as $\frac{1}{8}$ " square
- Floating tap locates itself in hole
- Individual spindle holds taps, thus change requires only seconds.



Weight 800 lbs.
Crated ready for shipment.

Write for pamphlet and information.

**TOOLS,
INC.**

1735 No. 25th Ave. • Melrose Park, Ill.

Use postpaid card. Circle No. 470

Right bite makes vises work better, last longer

Interchangeable jaw faces, made in varying degrees of hardness, help make Wilton machinists vises work better and last longer. The right jaws for ordinary shop work can noticeably damage finely finished parts or soft materials, and softer jaws tend to wear out too rapidly when used for heavier clamping jobs. To combat this problem the manufac-



KEO

WOODRUFF KEY SEAT CUTTERS



High speed steel. Arbor type. Correct dimensions for Woodruff Keys, with $\frac{1}{32}$ " oversize O.D. to permit resharpening. Regularly furnished without clearance on side teeth.

For quality, price and service investigate Keo combined drills and countersinks, T-slot cutters, center reamers and lathe mandrels. Big stock for fast delivery.

WRITE, WIRE OR PHONE
for illustrated literature
Jobbers' inquiries invited

KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

Use postpaid card. Circle No. 471

turer has designed interchangeable, reversible jaw faces in five different materials: steel, diamond serrated, hardened; steel, smooth, hardened; steel, smooth, soft; brass or copper, smooth; plastic fibre, smooth. In addition, universal brass and copper jaw caps are available to fit over any of the steel or fibre jaw faces.

Wilton Tool Mfg. Co., Inc., Dept. RB, Schiller Park, Illinois.

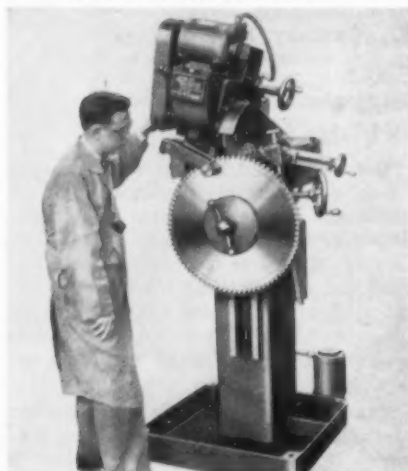
Use postpaid card. Circle No. 163

Circular saw blade sharpener

The G-45 blade sharpener sharpens blades from 8" through 45" diameter. With one setting grinders can grind alternating high and low teeth—such as the Motch & Merryweather "Triple-Chip grind" in which the high tooth is chamfered on either side, and the following tooth is square.

The grinding contour is automatically produced by cam action with index plates controlling the tooth spacing. Varying diameters, thicknesses, rake angles, and pitches can be ground with this automatic saw sharpener. Motch & Merryweather Machinery Co., Dept. RH, 888 E. 70th St., Cleveland, O.

Use postpaid card. Circle No. 164



Use postpaid card. Circle No. 472

Another

VICTOR VALUE

Top Quality
Lowest Prices

Our special import...

DIAMOND WHEEL DRESSERS

Made of selected, full individual stones, mounted in 7/16" diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
1/4	\$ 6.00	\$ 2.85
1/2	12.00	5.00
3/4	21.00	7.50
1	30.00	10.25
1 1/2	54.00	15.00
2	75.00	20.00
2 1/2	102.00	26.00
3	130.00	32.00

These diamonds can be set in any shank to your specifications for \$1.00 each extra.

Order today—Immediate
Delivery from Stock!

VICTOR

MACHINERY EXCHANGE, INC.

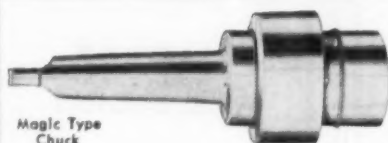
Dealers in Tool Room Equipment

Dept. A, 251 Centre St.

Tel.: CANal 6-5575, New York 13, N.Y.

Jig borer has three systems of measurement

Purported to be the only machine in its size range offering three distinct systems of co-ordinate measurement, the Omega jig borer, with 20" x 32" hand scraped table, is equipped with trays for utilizing dial indicators and ultra precision end measuring rods. In addition to the trays, the machine is



Magic Type
Chuck

THE COLLIS MAGIC-TYPE CHUCKS

Reduce production costs with Collis Magic Chucks. Now tools can be changed without stopping or slowing down the spindle. Boring, counter boring, drilling, reaming, tapping, etc., can be performed practically continuously.

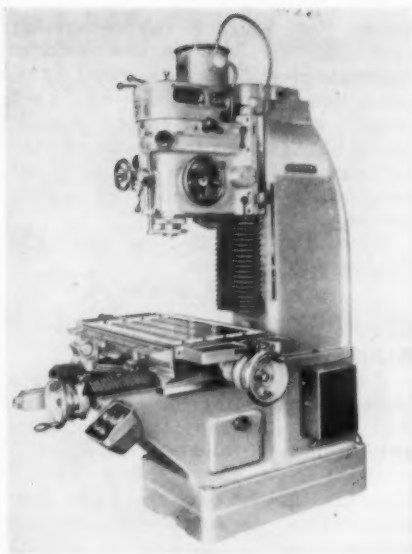
Let our 40 years of manufacturing experience help your customers select the proper equipment for the job.

"Call Collis For Service"

THE COLLIS CO.

Dept. A, Clinton, Iowa

Use postpaid card. Circle No. 473



supplied with hardened and ground screws accurate to plus or minus .0004" in the total table travel of 15" x 20".

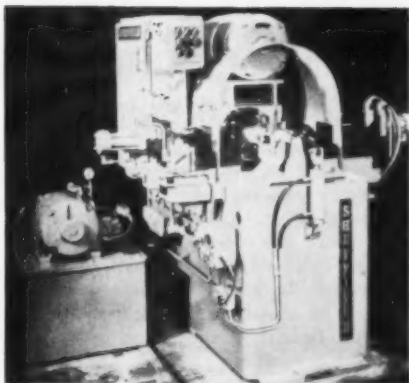
Jig Borer has sixteen spindle speeds from 35-1500 rpm, and features a quick acting, nose type, tool changing device. Maximum distance from spindle nose to table top is 20". Distributed by Ami-tool Company, Dept. DL, 629 Main St., Westbury, L.I., N.Y.

Use postpaid card. Circle No. 165

Bicycle crank thread rolling machine

Both right and left hand threads can be rolled on bicycle cranks in a single, automatic cycle on this Sheffield-Murchee machine at a rate of approximately 120 parts per hour, including load and unload time. Machine consists of a floor-type base on which are mounted two "Precision-Rol" units operated by a hydraulic sub-slide assembly.

The crank is loaded between centers and clamped in the work-holding fixture. Next, the operator pushes a



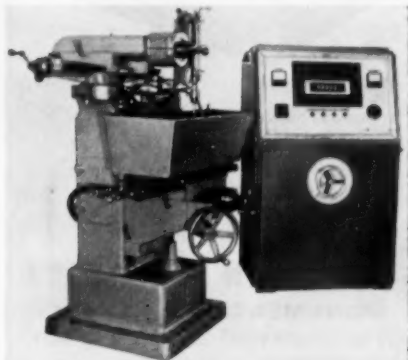
button to actuate a special oversize thread rolling unit to roll the 15/16"-24 right hand thread. After the unit retracts, the standard No. 875 attachment comes into position for rolling the 7/8"-24 left hand thread to complete the automatic cycle. The right hand thread rolls are extra large to clear

the driving lug on the bicycle crank. Sheffield Corp., Dept. JS, Dayton 1, O.

Use postpaid card, Circle No. 166

Electronic erosion machine

The new Abaco electronic erosion machine operates on a 20% higher cycle



Now! Standardized Punches at 60% savings

A standardized, centerless ground perforating punch that gives you immediate savings!

ACCURACY

QUALITY

ECONOMY

DELIVERY

Here's Why!

Centerless ground to within .0002" in diameter!

A special, high carbon steel insures tough, lasting durability!

Standardization means smooth high speed turn-out . . . at only 40% of the cost of making your own!

Large stock of high carbon punches in many sizes, means shipment the SAME DAY that your order is received!

Hundreds have standardized with ROSS high carbon and HIGH SPEED STEEL perforating punches. Write, today, for a FREE punch sample and descriptive literature!

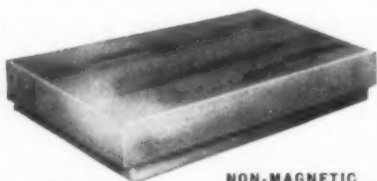
ROSS

ROSS EQUIPMENT CO., INC.

79 College Ave. Rochester 7, N. Y.

Use postpaid card. Circle No. 474

BIO - GRANITE SURFACE PLATES



SIZES 9" x 12"
TO 60" x 120"

ACCURACY GUARANTEED
.00005 ON SIZES UP TO
24" x 36"

Made of genuine fine-grained Biotite
Granite


Write for Circular and Prices
Some Dealer Territories Open

BENJAMIN HOROWITZ
MONUMENT WORKS, INC.

33 SECOND AVE., NEW YORK 3, N. Y.

Use postpaid card. Circle No. 475

**READ TEMPERATURES
FAST**



**ACCURATELY
with PYRO
OPTICAL PYROMETERS**

Send for catalog No. 85
PYROMETER INSTRUMENT CO., INC.
Bergenfield 3, New Jersey

Use postpaid card. Circle No. 476

than the previous model. It reproduces directly the shape and profile of a soft master electrode in carbide or already hardened alloy through the use of a spark, with an accuracy of $\pm .0015$ and 10 micro-inch finish.

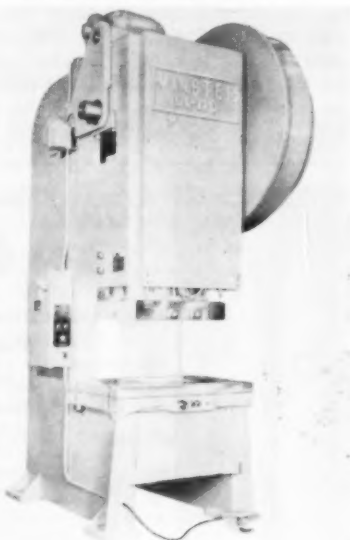
The rotating high frequency motor generator is at the bottom of the machine. This 5 hp unit is fed ordinary

three phase, 220 V, and generates high frequency single phase current. This alternating current is rectified and changed into pulsating dc through the three air-cooled mercury rectifiers. Each tube is heated and fed by an individual transformer.

The rectified pulsating current is fed through resistors, balancing coil circuit to one of several batteries of capacitors. They store the electrical energy, which is then released through half-inch dia. conductor to working electrode. Each battery of capacitors corresponds to a pre-set finish, which is changed by turning a switch.

Abaco Industries Inc., Dept. DL, 78-21
Queens Blvd., Elmhurst, L.I., N.Y.

Use postpaid card. Circle No. 187



Single point gap press

This 110 ton capacity press of the fixed base type is an addition to Minster's Series G1 single point gap press line, which features fabricated steel C frame construction.

Unusually long press gibs and bronze lined ways maintain accurate slide to

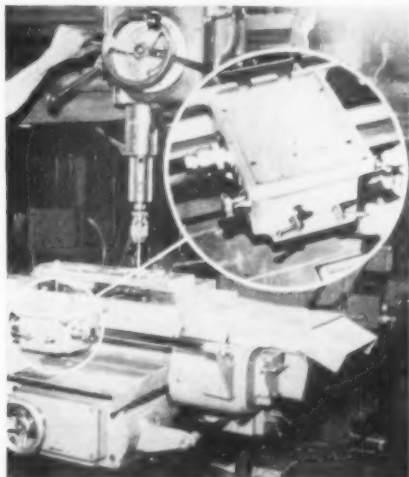
bed parallelism. Area of slide is 21" F to B x 28" L to R; area of bed is 27" x 42". Slide adjustment is of the barrel type and may be either manual by ratchet wrench or air power.

Press illustrated is single geared type operating at standard speed of 37 s.p.m. Combination air friction clutch and brake unit is mounted on the crankshaft within the main drive gear. Drive gear itself turns on anti-friction bearings and is totally enclosed running in oil. This arrangement makes it possible to offer variable speed operation, such as 37 to 74 s.p.m. with standard 5" stroke, thus increasing adaptability of press through selection of most suitable speed for operation being performed. Press is also offered in flywheel type. Minster Machine Co., Dept. JS, 250 West St., Minster, O.

Use postpaid card, Circle No. 168

Improved indenter mechanism for indexing table

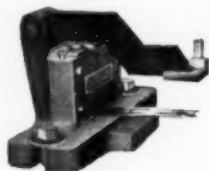
Two improvements to the indenter mechanism of the Micro-Positioner automatic indexing table give added as-



surance to the accuracy of the unit. Micro control knobs and locks allow

complete adjustment of the indentation sensing and tape relocating; indenter safety switch prevents any possible indenting unless tape is installed and mechanism is in indenting position. Indexing table, makes possible reproduction of complex drill or tapping patterns to an accuracy of .001". Micro-Positioner Corp., Dept. KE, 716 Wilshire Blvd., Santa Monica, Calif.

Use postpaid card. Circle No. 169



New Low Cost AUTOMATIC SCRAP CHOPPER

3" wide \$69.00

6" wide \$95.00

12" wide \$195.00

Write for details

JACO DEVICES, INC.

99 High St., Hingham, Mass.

Use postpaid card. Circle No. 477

The New SCHERR MICRO-PROJECTOR

with the
VERTICAL design

NEW
1957
SELF CONTAINED
IMPROVED MODEL

FEATURING

- ✓ RIGID FLOOR BASE - ELIMINATING EXTRA CHARGE PER TABLE
- ✓ TILTING STAGE FOR HELIX, ANGLES AND BEVELS
- ✓ 4" DIA. STAGE OPENING
- ✓ COLUMN SLIDE ADJUSTABLE FOR WEAR BY MEANS OF 418 - WILL HOLD SQUARE INDEFINITELY
- ✓ CUSTOM MADE PRECISION COATED LENSES & DOUBLE CONDENSERS FOR DIFFERENT OBJECTIVES. 10 TO 100X MAGNIFICATION.
- ✓ AN ENTIRELY NEW PRACTICAL DESIGNED TOOL FOR INSPECTION DEPARTMENT AND PRODUCTION SHOP.

WRITE FOR ILLUSTRATED FOLDER

GEO. SCHERR CO., Inc.

COMPLETE LINE OF PRECISION INSTRUMENTS

200-MT LAFAYETTE STREET • NEW YORK 12, N.Y.

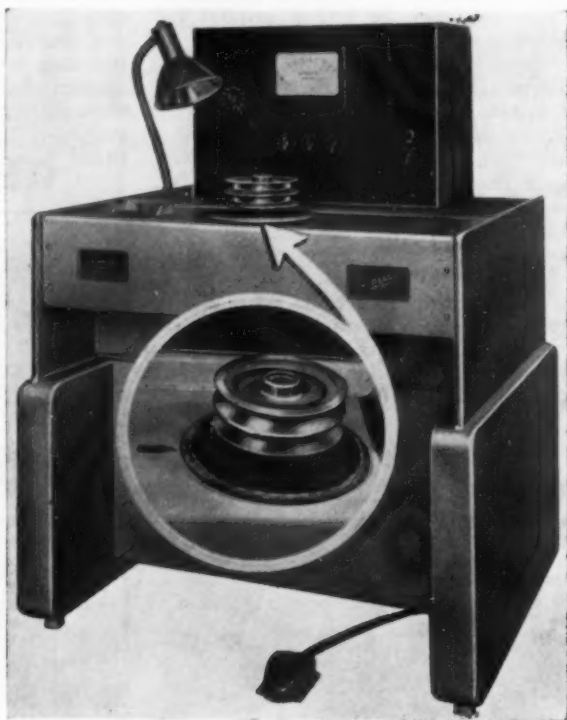
Use postpaid card. Circle No. 478

Vertical Static Balancing Machines

The Beko Model 201-VL vertical static balancing machine has weight capacities of 1 to 20 lb., and will handle diameters up to 20 inches. The Model 201-VH will handle 5 to 75 lb. and diameters up to 20 inches. For balancing impellers, blower wheels, flywheels, fans, pulleys and other parts having no integral shaft.

Magnitudes of unbalance are indicated by a large, easy-to-read meter, calibrated directly in terms of unbalance correction procedures selected. Angular positions are pointed out by a stroboscopic lamp, and are readable either as a location to remove weight or as a location to add weight, dependent upon the users' correction procedure. MacDell Sales Div., Balance Engineering Co., 850 W. Lake St., Chicago 7, Ill.

Use postpaid card. Circle No. 170



Precision Gear Grinder

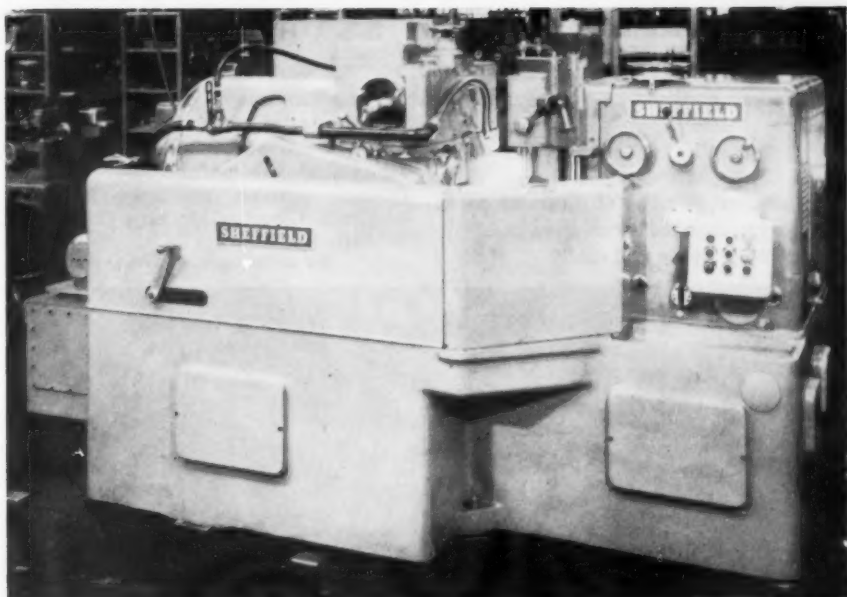
The Sheffield Model 140 reciprocating precision gear grinding machine grinds external precision spur and both right and left hand helical gears from 8 to 100 pitch.

Gears ground on this machine are used in precision instruments, gear train timing devices, fire control mechanisms, aircraft accessory power units, machine tools, engines, transmissions and where quiet gear operation is necessary. A number of gears of the same type can be ground simultaneously from hardened steel in preformed or solid

blanks, or gears can be ground individually.

The grinding wheel (12" x 5" x 1/2" to 2") is formed to the basic rack form by the automatic Crushtree wheel dressing process. Gear blank or blanks are mounted in grinding position between head and tailstock centers.

The grinding operation is similar to hobbing in that the work rotates continuously at a rate of speed synchronized with that of the grinding wheel. Simultaneously the work moves upward past the horizontal center of the



wheel until the tooth form is imparted to the full face of the gear blank. In addition to this basic hobbing motion the work rolls across the full face of the helical rack form of the grinding wheel.

Grinder will accommodate a maximum work diameter of 8" o.d. x 5" face width. Maximum length between centers is 15". Change gears permit the number of teeth that can be ground to range from 4 to 192.

Maximum helix angle adjustment of

wheelhead is 45° right and left hand. The grinding wheel is mounted on a precision pre-loaded ball bearing spindle. Grinding wheel spindle speed is 2100 rpm; crushing speed, 116 rpm.

The machine occupies a floor space 103" x 132" and is 71" high. All electrical and hydraulic units are to J.I.C. standards.

The Sheffield Corp., Dept. RH, Dayton, 1, Ohio.

Use postpaid card, Circle No. 171



for chamfering bar stock

PRIOR TO SCREW MACHINE OPERATIONS

The KENT BAR POINTER

Entirely self-contained. Manual or pneumatic operated feed and gripping mechanism. Capacity $\frac{3}{8}$ " minimum diameter up to 2 $\frac{1}{4}$ " hexagon. Stationary and portable.

Literature available.

The KENT MACHINE CO., Cuyahoga Falls, O.

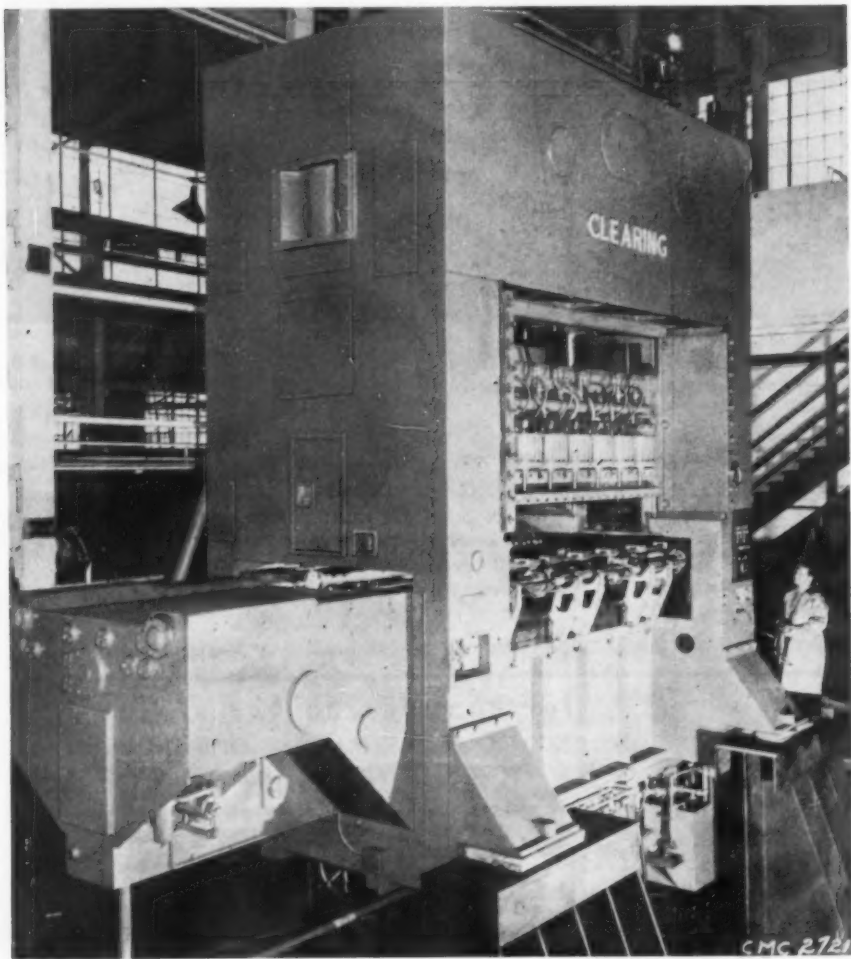
Drillers • Threaders • Slotters • Countersinkers • Bar Pointers

Presses Combine Automatic Operation with Versatility

Transflex multiple-purpose automatic presses remain useful in spite of design changes in the product manufactured. They are designed to be used to produce a number of different parts and to be changed over from one job to another quickly and easily.

Those features of the press that need to be changed when different parts are run are adjustable: feed stroke (distance that the part is moved); feed fingers; cushion positions; knockout positions. Clearing Machine Corp., 6499 W. 65th St., Chicago 38.

Use postpaid card. Circle No. 172

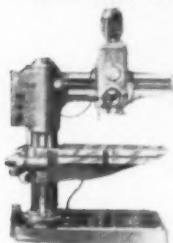




NEW MACHINE TOOLS

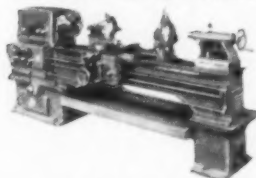
**FOR SALE OR RENT — TERMS UP TO 10 YEARS
OVER 50,000 OF THESE MACHINE TOOLS IN USE**

MASTER RADIAL DRILLS



2'
to
12'

TOOL & ENGINE ROOM LATHES



10" x 30" to 16' x 100"

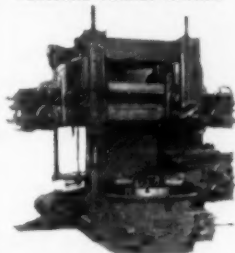
Just Off The Press!

OERLIKON VERTICAL MILLING MACHINE



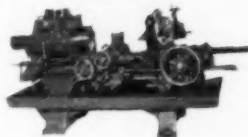
World Famous Machine Tool
Builder

VERTICAL TURRET LATHES



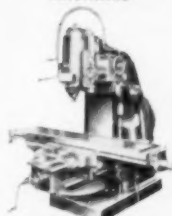
24" to 120"

TURRET LATHES



No. 3, 4, 5—IAP, 2AP, 3AP,
4AP
Ram & Saddle—Tracer & Auto
Cycle Avail.

DPV4 SUPER MILLING MACHINES



No. 2, 3, 4, 5, 6 Plain, Univ.
& Vert., Sgl. & Dual Power

SUPER BORING MILLS

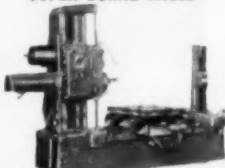
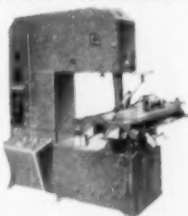


Table Type—2" to 5"
Floor Type—5" to 12"
Avail. w/dbl. spds. — Electro-
mag. clutches

BAND SAW & FILING MACHINES



10" to 72" throat



1957 Listings of 2500 Toolroom,
Production & Fabricating Ma-
chines. Write Dept. N-1.



MACHINERY CO.
NEW EQUIPMENT DIVISION

145 53rd St.

Brooklyn 32, N.Y.

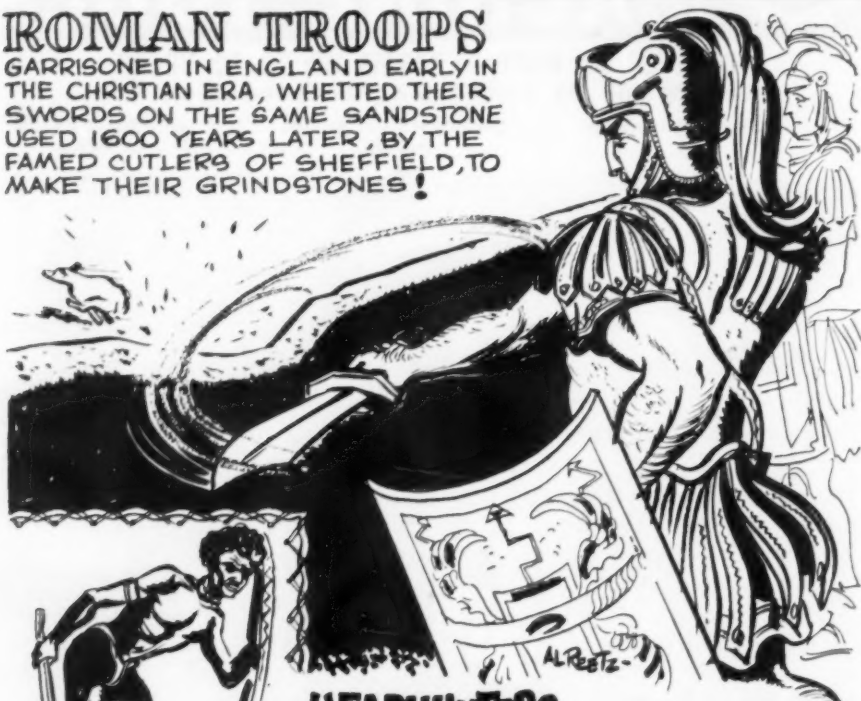
Phone: HYacinth 2-7400; Cable: Sandstools

Use postpaid card. Circle No. 481

Mechanics Through The Ages

ROMAN TROOPS

GARRISONED IN ENGLAND EARLY IN THE CHRISTIAN ERA, WHETTED THEIR SWORDS ON THE SAME SANDSTONE USED 1600 YEARS LATER, BY THE FAMED CUTLERS OF SHEFFIELD, TO MAKE THEIR GRINDSTONES!



THE HEADHUNTERS

OF NEW GUINEA KNEW HOW TO FASHION KNIVES OF SPLIT BAMBOO SO KEEN THAT THEY COULD EASILY LOP OFF THE HEAD OF A MAN! THESE KNIVES WERE "SHARPENED" FOR REUSE SIMPLY BY PEELING OFF A LITTLE MORE BAMBOO!



A Guinea a Day -

(ROUGHLY ABOUT \$2.94) SEEMS TO HAVE BEEN THE PAY GIVEN TO BRUNEL, FAMED MECHANIC OF THE EARLY 1800'S, FOR SUPERVISING THE INSTALLATION AT ENGLAND'S PORTSMOUTH DOCKS OF THE COMPLICATED PULLEY BLOCK-MAKING MACHINERY HE DESIGNED. HE GOT AN EXTRA 10 SHILLINGS (ABOUT \$1.40) PER DAY FOR EXPENSES WHILE AWAY FROM THE JOB.



AMERICAN

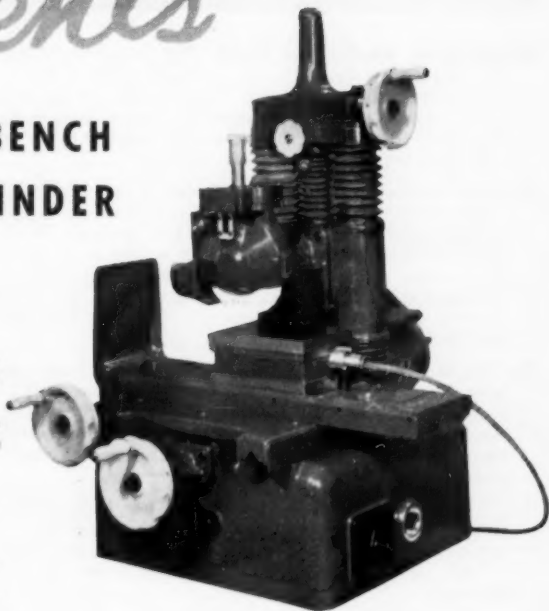
LIP

CORPORATION

Presents

**PRECISION BENCH
SURFACE GRINDER**

- ★ **EFFICIENT**
- ★ **ACCURATE**
- ★ **VERSATILE**



This compactly designed surface grinder is especially adapted for the precision dry grinding of small parts: dies, tools, gauges and instrument components. The low-cost LIP surface grinder permits the spot use of a number of machines strategically located throughout the plant. Features: Automatic spindle play take-up; precision ball bearings, counter balanced grinding wheel, bellows for dust protection.

FOR LITERATURE AND PRICES WRITE TO:

**AMERICAN
610 Fifth Avenue**

LIP

**CORPORATION
New York 20, N. Y.**

Tel.: Circle 6-0088

Use postpaid card. Circle No. 482

DON'T OVERLOOK THESE FEATURES

MACHINE AND TOOL

blue book

Round-up of Washington News. The Small Business Administration and the U.S. Department of Commerce recently announced their intentions to increase the volume of government to small business. The SBA and the Dept. of Commerce will have the full cooperation of the new Congress.

German Production Methods of Today. Bill Schleicher, Hitchcock's vice-president and editorial director recently completed an extensive trip through West Germany and brings you his first report on behind the scenes production methods. Industrial centers are being rebuilt in an effort to again put the country on its feet economically. Be sure and see this inside report.

Do You Have a Parts Obsolescence Problem? Find out how Kaiser Steel's dollar-wise preventive obsolescence program reduced its maintenance spares inventory by \$1,000,000 in 1955, yet at the same time all but eliminated outages in any parts category.

5½" Long Holes Drilled at 120 Pcs. per Hour Rate. A Starbore drill mounted on an automated boring machine is fed at the rate of 15 ipm to produce 7/16" diameter holes in cast iron valve guide bushings.

News of Automation. A new 27-station transfer machine now makes it possible to process two sets of bearing caps at once. It automatically loads two bearing cap castings, performs 80 operations on 240 complete sets per hour and automatically feeds assembly conveyor.

Routing Rolled Contoured Wing Skin. Story shows how a standard radial arm router was modified for adjustment of the router head to any vertical setting within machine limits with finger tip control.

How Ford Increased Production with Ceramic Tools. For machining sliding gears at the transmission plant in Dearborn, Mich., Ford discovered that ceramic tools were the answer.

Labor Relations. Can you fire a man for trying to get another worker to slow down? You'll find the answer to this and other questions in the "How Would You Decide" section.

PAGE

87

103

114

126

129

136

140

145

The MARKET PLACE

Advertisements acceptable in THE MARKET PLACE include those for employment, sales services, production facilities, representation and related needs. Rates: \$20 per column inch per insertion. Maximum size advertisement accepted in this section is three inches.

Copy should reach us by the first of the month for next month's issue.

MACHINE and TOOL BLUE BOOK

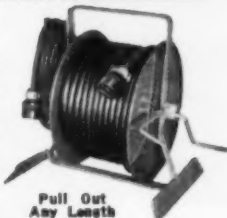
A Hitchcock Publication

Wheaton, Ill.

New "HANDYREEL"

Hundreds of Uses in Plant, Mill, Factory

Be ready for work in seconds. Supplies current to 300 ft. Reel stays at source of power—no lifting, etc. Holds 300' No. 10; 200' No. 14; 130' No. 12. Sturdy, lightweight. Steel drum. Adjustable brake. 12" wide. 12 1/4" high. Sold less cord.



Pull Out Any Length

Order By Mail
Direct From Factory
Send Check or M.O.

**LAKE SHORE
PRODUCTS**
WOODINVILLE, WASH.

ONLY **7⁹⁵** POSTPAID

ACETATE SHEETS

UP TO 1/4" THICK

Sheet sizes

20" x 50"

INDUSTRIAL PRODUCTS SUPPLIERS

201 S. Dean St., Englewood, N. J.

Ideal for Machine Guards
Windows
Safety Shields
Blue Print Covers

"Key to Preventive Maintenance"

MACHINE TOOL RECONDITIONING

& the Art of Hand Scraping (New 2nd printing)—useful for design, shop & inspection work

Write for folder describing illustrated book

MACHINE TOOL PUBLICATIONS

215 Commerce Bldg., East 4th St.
St. Paul 1, Minn.

Don't forget to mention MACHINE and TOOL BLUE BOOK when writing advertisers, or use the handy Readers' Service card opposite page 64.

1 Minute

to locate an edge within .0005"!



JUMP EDGE FINDER

PRICE \$2.50 Complete satisfaction — or full refund.

Postage free if payment with order

ELISHA PENNIMAN ELMWOOD 10,
CONN.

FILES AND VACUUM PUMPS

WRITE US.

WILLIAM REID CO.

2271 Clybourn,

Chicago 14, Ill.

Make your own Storage & Pallet Racks



with Amidon Fittings
and one inch pipe.

Amidon Engineering Co.
ELYRIA 10, OHIO

WANTED

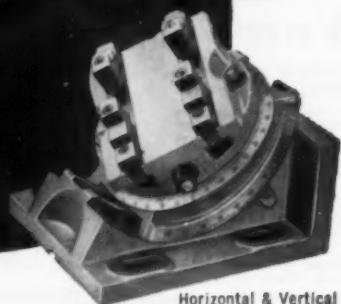
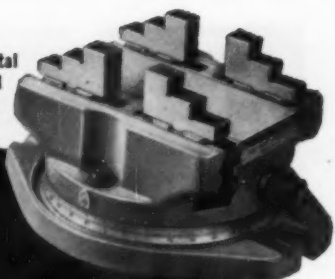
Agent to represent well established cutting tool manufacturer on special cutters, reamers, drills, etc., also tool reconditioning. Write to:

1397 Manistique • Detroit 5, Michigan

MULTI-PURPOSE WONDER GRIP VISES

4 STEPPED JAWS PERMIT CLAMPING of rough castings, irregularly shaped, round, and tapered pieces accurately and quickly, eliminating need for special jigs or fixtures. Narrow stepped jaws allow free access to and measuring of work pieces and provide clearance for cutting tools. Small work pieces machined on three sides without reclamping. Easy and quick to mount and align on any machine. Holds rigid in any position without vibration. Various capacities and extra soft jaws available.

Horizontal
Swivel
Type



Horizontal & Vertical
Swivel Type

TAPPING ATTACHMENTS

Reversible safety tapping attachments with adjustable graduated friction drive, hardened, ground and lapped, complete with torque bar and handles. Precision made throughout by long established reputation West German factory.



Tested for Performance to High Amer. Standards
Immediate Delivery from N.Y. Stock

MADE IN GERMANY

Low Competitive Prices

- Quick Change Chucks and Collets
- Wille-Grip Keyless Drill Chucks
- Milling Machine Arbors, Adapters, Arbor Spacers and Bearings
- Lathe Mandrels



Our Headquarters in New York City

Write for complete details and prices to Dept. 20

M.B.I.
EXPORT & IMPORT LTD.

A Division of Machinery Builders, Inc.

475 Grand Concourse, Bronx 51, N. Y.

"Over 20 years experience in
designing and building machinery"

CABLE ADDRESS: Machbuild New York
Phone: MOHt Haven 5-0900

DISTRIBUTOR INQUIRIES INVITED

Also United States Distributors
of European Machine Tools

INDEX TO PRODUCTS IN THIS ISSUE

MACHINE AND TOOL

blue book

A

Abrasive Cloth, Paper, Discs, Wheels, Stones,
Belts, etc., 8-9, 20, 51, 58, 153, 237, 251, 257
Abrasive Cut-Off Machines, 249
Abrasive Finisher, 96
Accumulators, 264
Air Collet Closer, 254
Air Compressors, 262
Air Control Equipment, 262
Air Filters, compressed, 68
Air Tools, 263
Alloys, 102, 163, 172
Angle Dressers, 283
Angle Plates, 59, 219
Arbors, 71
Assembly Machines, 50, 166
Axles, 71

B

Backrests, 125
Balancing Machines, 66-67, 218, 263
Balancing Tools, 66-67, 215, 218, 302
Band Saw Wheels, tires, 272
Bar Racks, 296
Bar Pointer, 313
Bars, 102
Bearing Rollers, 71
Bearings, thrust, 303
Belt Sanders, 273
Benches, work, 113
Bender-Cutter, 238
Bending Machines & Equipment, 69, 82, 92, 184,
249
Blocks, V, 252
Boards, control, 174
Books, 23
Boosters, 264
Boring Bars and Tools, 24, 154
Boring Heads, 286, 304
Boring Machines, 35
Boring Mills, 315
Boring Spindles, 26
Boring Tools, 154, 245
Brakes, press, bending, 27, 52, 82, 184, 329
Broaches, 360
Broaching Attachments, 32, 38-39
Broaching Machines, 8-9, 38-39, 52, 258
Broaching Service, 258
Buffing Machines, 271
Burners, gas, 285
Burs, 40, 118, 176, 252, 280
Burs, carbide, 118
Bushings, 53, 89, 300
Bushings, drill jig, 7, 53, 291
Bushings, rotary, 309

C

Calipers, 276
Cam Grinding, 238
Cam Milling, 238
Cams, 149, 238, 245
Carbide Stock, 172
Carbide Tools, 21, 24, 29, 40, 98, 118, 135, 160,

176, 252, 267, 280, 304
Carbon, 102, 163
Centers, bullnose, 260
Centers, live, 167, 253, 257, 272
Ceramic Tooling, 24
Cermets, 172
Chamfering Machines, 92
Chamfering Tools, 24
Chucking Equipment, 247
Chucks, 32A, 247, 306
Chucks, air-operated, 32A, 247
Chucks, collet, 247
Chucks, drill, 62
Chucks, hand operated, 297
Chucks, magnetic, 56
Chucks, quick-change, 239
Chucks, tapping, 62, 239
Clamps, 93
Clamps, fixture, 93
Clamps, toggle, 93
Clutches, 323
Clutches, friction, 323
Coatings, protective, 64
Coil Cradles, 46
Cold Roll Forming Machines, 42
Collet Closer, air, 254
Collets, 3, 167, Back Cover
Comparators, 235
Control Boards, 174
Control Systems, 174
Coolant Pumps, 242
Coolants, 8-9, 14-15
Cotter Pins, 261
Counterbores, 135, 304
Countersinks, 135, 306
Couplings, flexible, 303
Cut-Off Blades, 34, 125
Cut-Off Machines, 34, 249, 288
Cut-Off Wheels, 20, 249
Cutter Sharpening Machines, 8-9
Cutters, 43, 98, 131, 176, 267, 304
Cutters, face mill, 43
Cutters, inserted blade, 43, 98, 131
Cutting Fluid, oils, 8-9, 14-15
Cutting Tools, 18-19, 40, 53, 65, 98, 134, 135,
176, 235, 267, 267, 326
Cylinders, hydraulic, pneumatic, 32A, 264

D

Dairy Equipment, 53
Deburring Machines, Tools, 47, 92
Dermatitis Control, 187
Dial Calipers, 276
Dial Feeds, 179
Dial Indicators, 2, 144
Diamond Wheel Dressers, 307
Diamond Wheels, 20
Die Buttons, 59
Die Cushions, 52
Die Heads, 75
Die Holders, 125
Die Making Machines, 31
Die Sets, 46, 73, 305
Dies, 21, 29, 89

P
R
O
D
U
C
T
S

I
N
D
E
X

Dies, carbide, 21
Dies, press brake, 184
Disinfectants, 187
Dividing Heads, 47, 217, 306
Dowel Pins, 256
Draw Bars, 167
Dressers, diamond wheel, 307
Dressers, wheel, 51, 146, 275, 283
Drill Bushings, miniature, 291
Drill Heads, 177, 178, 254
Drill Heads, multiple spindle, 254
Drill Point Thinners, 31
Drilling Attachments, 254, 287
Drilling Attachments, multiple spindle, 254, 287
Drilling Machines, 41, 193-204, 230
Drilling Machines, bench, 193-204
Drilling Machines, heavy duty, 193-204
Drilling Machines, horizontal, 193-204
Drilling Machines, multiple spindle, 193-204
Drilling Machines, precision, 193-204
Drilling Machines, radial, 25, 30, 35, 193-204, 315
Drilling Machines, sensitive, 193-204
Drilling Machines, turret, 12
Drilling Machines, universal, 193-204
Drilling Machines, upright, 180, 193-204
Drills, 18-19, 40, 45, 65, 135, 160, 280, 306, 326
Drills, carbide, 18-19, 280
Drills, center, 18-19
Drills, cobalt, 18-19
Drills, core, 98
Drills, taper, 45
Drills, twist, 135
Duplicating Attachments, 44, 152
Dust Collectors, 173, 279
Dye, layout, 223, 258, 277, 305

E

Edge Finders, 293
End Mills, 23, 40, 98, 135, 280, 304, 326

F

Fabricating Machines, 315
Fabricating Tools, 70
Facing Heads, 255, 296, 301
Facing Tools, 18-19, 24, 154, 304
Fastening Tools, 215
Feed Fingers, 3
Feeders, parts, 168, 211
Feeds, 164
Feeds, automatic, 164
Feeds, barrel, 168
Feeds, bowl, 168
Feeds, dial, 179
Feeds, roll, 46, 164
Feeds, slide, 46
Fiberglass, molded, 66-67
Files, 55, 209
Files, rotary, 176
Filing Machines, 31, 253, 315
Filters, 57
Filters, air, 63, 262
Finishers, abrasive, 96
Fitting Machines, 230
Fixtures, 300
Flame Hardening Machines, 74
Flat Stock, ground, Inside Back Cover, 69
Flexible Shaft Equipment, 85, 119
Flexible Shaft Machines, 85, 119
Furnaces, heat-treating, 285

G

Gage Blocks, 22, 68
Gage Units, universal, 183
Gages, 2, 16-17, 65, 160, 235
Gages, air, 2
Gages, carbide, 68

Gages, cylindrical, 16-17
Gages, dial, 144
Gages, electric, 2
Gages, plug, 16-17, 68
Gages, plug reversible, 16-17
Gages, ring, 16-17
Gages, thread, 16-17, 133
Gear Hobbers, 117
Gear Measuring Equipment, 68
Gear Shaving Equipment, 100
Gear Shaving Machines, 100
Gearmotors, 273
Gears, 74, 273, 303
Gears, flame hardened, 74
Gears, Geneva, 149
Granite Surface Plates, 69, 227, 310
Grinders, 251
Grinders, abrasive belt, 251, 257
Grinders, bench, 269, 317
Grinders, carbide tool, 251, 257, 269
Grinders, centerless, 95, 231
Grinders, cylindrical, 231
Grinders, face mill, 31
Grinders, gear, 231
Grinders, heavy duty, 269
Grinders, no dust, 251
Grinders, optical projection, 8-9
Grinders, oscillating spindle, 96
Grinders, portable air, 175
Grinders, precision, 32B, 332
Grinders, radius, 231
Grinders, saw, 34, 284
Grinders, special production, 231
Grinders, spline, 231
Grinders, surface, 32B, 51, 58, 69, 317, 332
Grinders, template tool, 31
Grinders, tool & cutter, 8-9, 31, 47, 332
Grinders, universal, 269
Grinding Spindles, 26, 53
Grinding Tools, 40
Grinding Wheels, 8-9, 20, 51, 58, 153, 237, 251, 257
Grooving Heads, 301
Grooving Tools, 24
Guide Pins, 89
Guide Posts, 71
Guide Rods, 71

H

Hammers, lead, 301
Handles, 240
Hardening Machines, 8-9
Hardness Testing Equipment, 171, 259
High Speed Steel, 243
Hinges, 291
Hobs, 135
Hotst Hooks, 37
Holders, indicator, 295
Holders, tool, 4, 29
Holding Tools, 78, 93
Hole Location Accessories, 293
Honing Fixtures, 1, 32D
Honing Machines, 1, 32D
Honing Stones, 32D
Honing Tools, 1, 32D
Horizontal Boring, 238

I

Index Centers, 256
Index Fixtures & Tools, 62
Index Tables, 149, 230, 256
Indexing Machines, 149
Indicator Holder, 295
Indicators, dial, 2, 295
Insert Bits, 24, 29
Inspection & Measuring Devices, 2, 133, 183, 311
Inspection Units, 247

for absolute satisfaction in

ALL INDUSTRIAL PURPOSES

Conway

"the Clutch of Robust Refinement"

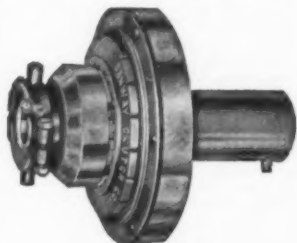
for starting . . . stopping . . . running machinery

A wide variety of types and sizes . . . all dependable in operation . . . economical . . . sturdy.

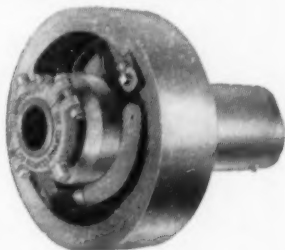
EVERY CONWAY CLUTCH OFFERS: contained and balanced construction, easy engagement, large lever ratio, direct release, drag-free idling, simple adjustment,

overload power capacity, large frictional areas and powerful leverage.

For 1957 Conway offers new ideas in clutch design about which you should know. Conway engineers are at your disposal to help with your clutch problems.



**WRITE
FOR
BULLETINS**



THE

CONWAY CLUTCH CO.

1105 MARSHALL ST.

CINCINNATI 25, OHIO

Use postpaid card. Circle No. 484

J
Jaws, face plate, 32A
Jig Bore, 35, 290
Jig Boring, 238, 304

K
Keys, machine, 261
Keys, woodruff, 261
Keyseat Cutters, 398
Keyseaters, 293
Knurling Tools, 125

L
Lapping Machines, 51, 216
Lapping Service, 68
Laps, 68
Lathe Attachments, 298
Lathes, 35, 47, 54
Lathes, automatic, 66-67
Lathes, engine, toolroom, 41, 315
Lathes, gap, 41, 47
Lathes, geared head, 206
Lathes, hydraulic tracer, 54
Lathes, precision, 165, 206
Lathes, speed, 271
Lathes, tool, gage-makers, 165
Lathes, tracer, 54, 212-213
Lathes, tray-top, 41
Lathes, turret, 66-67, 315
Lathes, vertical turret, 315
Layout Dye, 223, 258, 277, 305
Lead Jigs, 93
Leakproof Assembly Equipment, 265
Lifts, 97
Light Wave Equipment, 68
Lighting Equipment, 222, 272
Limit Switches, 251

M
Mandrels, 71
Mandrels, lathe, 306
Marking Devices, stamps, 224
Marking Machines, 305
Master Setting Discs, 68
Measuring, Checking Equipment, 69
Metal Forming Machines, 8-9, 184, 240
Metallizing, 191
Micrometer Dial Gages, 144
Micrometer Dial Indicators, 144
Micrometers, internal, 16-17
Micrometers, lightwave, 68
Milling Cutters, 43, 131, 135, 267, 304, 326
Milling Heads, 150-151
Milling Machine Attachments, 33, 44, 148
Milling Machines, 8-9, 33, 34, 44, 46, 206, 230, 299, 315
Milling Machines, bench, 291
Milling Machines, column type, 231
Milling Machines, hand, 189
Milling Machines, horizontal, 35, 77, 226
Milling Machines, ram type, 231
Milling Machines, turret, 44
Milling Machines, universal, 80-81
Milling Machines, vertical, 10, 35, 77, 80-81, 315
Milling Spindles, 26, 331
Mills, 176
Mist Collectors, 270
Motors, electric, 72
Motors, shaftless, 72
Multi-Diameters, 98

N
Nameplate Markers, 305
Nibblers, portable, 278
Notching Equipment, 289

Notching Units, 289
Nut Runners, 215
Nuts, 123
Nuts, lock, 123

O
Oil Groovers, 236
Oilers, stock, 46
Optical Flats, 68
Optical Inspection Devices, 147, 311

P
Packaging Machines, 66-67
Paint Sprayers, 262
Pans, tote, 293, 303
Parts Feeders, 168, 211
Pins, 256, 261
Pins, guide, 89
Pins, leader, 71
Pins, taper, 261
Pipe & Tube Mills, 42
Pipe Thread Leak Preventives, 265
Plastics, molded, 66-67
Plates, 227
Plates, angle, 50, 219
Plates, bench, 227
Plates, lapping, 227
Plates, sine, 50, 313
Plates, steel, 102
Plates, surface, 51, 68, 69, 227, 310
Plates, T-slotted, 227
Polishing Machines, 271
Portable Air Tools, 175, 215, 278
Portable Electric Tools, 215
Porting Tools, 304
Power Quills, 270
Precision Machining, 53, 304, 305
Press Brakes, 27, 52, 82, 184, 329
Press Room Equipment, 46
Presses, air, 262
Presses, bed and knee, 329
Presses, bending, 82
Presses, corrugating, 82
Presses, drawing, 82
Presses, drill, 193-204
Presses, forming, 82
Presses, hydraulic, 52, 228
Presses, mechanical, 52
Presses, O.B.I., 52, 229, 266
Presses, platen, 157
Presses, power, 70, 220, 329
Presses, punch, 82, 276
Presses, spring, 230
Presses, straight side, 184
Presses, transmat, 52
Pressure Regulators, 63
Protective Coatings, 64
Pulleys, 303
Pumps, coolant & lubricant, 242
Punches, 50, 248, 309
Punches, bench, 240
Punches & Dies, 59
Punches, transfer, 301
Punching Equipment, 60, 238, 240
Pyrometers, 310

Q
Quills, power, 270

R
Racks, bar, 296
Radius Dressers, 283
Railroad Pins & Bushings, 53
Ralls, 71
Reamers, 18-19, 40, 45, 65, 135, 160, 280, 304
Reamers, carbide, 280
Reamers, center, 306
Recessing Heads, 296
Recessing Tools, 125

Rewis, stock, 46
Regulators, air, 262
Reinforcing, steel, 102
Rivet Spinners, 245
Riveting Machines, 230, 245
Rods, guide, 71
Roll Feeds, 46, 164
Roller Holder, 125
Rollers, 159
Rolls, 60, 71, 240
Routers, 40

S

Sanders, belt, 273
Sanders, oscillating spindle, 96
Saw Blades, band, 61, 272, 282
Saw Blades, circular, 34
Saw Blades, hack, Inside Front Cover, 32C
Saw Guides, 272
Saw Sharpeners, 34, 284
Sawing Machines, 60, 230, 244, 253
Sawing Machines, band, 35, 69, 242, 282
Sawing Machines, circular, 34
Sawing Machines, cut-off, 69
Sawing Machines, friction, 60
Sawing Machines, hack, Inside Front Cover, 60
Saws, slitting & slotting, 326
Scrap Cutters, 311
Screw Drivers, power, 108
Screw Machines, automatic, 47, 74, 230
Screws, cap, set, socket and machine, 86, 220-221
Services: Boring, Grinding, Lapping, Milling, Repairing, etc., 53, 238, 304, 305
Shafts, 71, 256
Shapers, 11, 27, 206
Shavers, 236
Shearing Machines, 27, 60, 240, 250
Shears, alligator, 240
Shears, bench, 240
Shears, hand, 240
Shears, lever, 240
Shears, punch, copor, 60
Shears, throatless, 250
Sheet Metal Machinery, 240
Sheets, 102
Sine Bars, 251
Sine Plates, 50, 251
Skin Protection, 187
Slide Feeds, 46
Slitting Machinery, 42
Slotters, 259
Socket Screw Products, 86, 220-221
Special Machinery, 84, 80, 62, 230, 329
Special Purpose Steel, 243
Special Tools, 135
Speed Reducers, 273, 303
Spindles, 46, 71, 331
Spindles, boring, 26
Spindles, grinding, 26, 53
Spindles, internal grinding, 26
Spindles, milling, 26, 331
Spotfacers, 98
Sprockets, 303
Square Hole Drills, 240
Stainless Steel, 102, 163
Stamps, steel, 224
Steel and Steel Stock, Inside Back Cover, 28, 69, 71, 94, 102, 163, 243
Steel Blue, 277
Stock Oilers, 46
Stock Reels, 46
Stock Straighteners, 46
Stops, 125
Straighteners, 46
Structurals, 102
Stud Setters, 239
Superfinishers, 66-67

Surface Grinding, 238
Surface Plates, 51, 68, 60, 227, 310
Switches, limit, 251
Strip, steel, 102

T

T-Slot Cutters, 306
Tables, box, 47
Tables, compound, 256
Tables, elevating, adjustable, portable, 113, 225
Tables, rotary, index, 149, 230, 256, 304
Tables, tilting, 47, 256
Tallie Metal, 172
Tap Die Holders, 125
Tap Guide, 219, 255
Tap Holders, 125
Tap Sharpeners, 191
Taper Pins, 261
Tappers, 36, 219, 254, 255, 287
Tappers, automatic reverse, 254
Tappers, hand, 219, 255, 306
Tapping Attachments, 63, 239, 254, 287, 320
Tapping Heads, 62, 177, 178, 239, 287
Tapping Machines, 12, 36, 62, 230, 239
Tapping Machines, precision, small hole, 115
Tapping Units, 62
Taps, 16-17, 18-19, 65, 134, 135, 160, 234, 326
Taps, stub screw, 234
Thread Checkers, 133
Thread Grinding, 238, 305
Thread Measuring Wires, 68
Thread Rolling Machines, 13
Threaders, hand, 219, 255
Threading Heads, 91
Threading Tools, 4, 91
Toggle Pliers, 93
Tool Heads, 296, 301
Tool Holders, 4, 29
Tool Posts, 125
Tool Sharpening Machines, 284
Tool Steel, Inside Back Cover, 28, 69, 94, 243
Tool Tips, 29
Tooling, precision, 24, 52, 78
Tools, dies, 89
Tote Pans, 293, 303
Tracer Tools, 298
Transfer Machines, 48-49
Transfer Punches, 361
Trepanning Cutters, 288
Tube Cutting Machines, 288
Tubing, 102, 163
Turning Heads, 149, 296, 304
Turning Tools, 18-19, 125, 154

U

Undercutting Heads, 296, 301

V

V-Blocks, 252
Valves, air, 262
Vise Stop, adjustable, 293
Vises, air-powered, 262, 276
Vises, bench and machine, 241, 268, 275, 290, 291, 292, 320
Visual Control Systems, 174

W

Ways, balancing, 302
Wear Parts, 29
Wheel Dressers, 51, 275, 283
Wheel Dressers, diamond, 307
Wheels, cut-off, 153
Wire, Straightening Machines, 46
Wires, measuring, 68
Wrenches, 37
Wrenches, automatic, 281
Wrenches, power, 32A
Wrenches, socket, 37
Wrenches, torque, 245

SID TOOL COMPANY, INC.

Your headquarters for Special
Taps and Drills now stocks...

HIGH
SPEED

SPECIAL SIZE

MILLING
CUTTERS



SIDE MILLING CUTTERS

Precision made in U.S.A.

**IN STOCK FOR
IMMEDIATE DELIVERY!**

DIAM- ETER	WIDTH OF FACE	SIZE OF HOLE	PRICE EACH
4	7/32	I	11.40
4	9/32	I	13.35
4	5/16	I	13.70
4	7/16	I	15.05
4	9/16	I	17.15
4	11/16	I	18.10
4	13/16	I	20.85
4	15/16	I	22.95
4	I	I	23.65
4	I - 1/8	I-1/4	24.75
4	I - 1/4	I-1/4	29.35
5	1/4	I	17.80
5	5/16	I	17.80
5	3/8	I	19.70
5	7/16	I	20.95
5	9/16	I	23.85
5	11/16	I	24.30
5	13/16	I	28.35
5	7/8	I-1/4	30.50
5	15/16	I	31.50
6	1/4	I	21.90
6	5/16	I	22.10
6	3/8	I	23.70
6	7/16	I	25.90
6	9/16	I	31.20
6	11/16	I-1/4	33.45
6	13/16	I-1/4	35.75
6	7/8	I	36.68
6	15/16	I-1/4	36.50
8	1/4	I	47.70
8	5/16	I	49.70
8	3/8	I	51.05
8	7/16	I	53.70
8	1/2	I	54.55
8	9/16	I-1/4	56.65
8	5/8	I-1/4	57.50
8	11/16	I-1/4	59.35
8	13/16	I-1/4	60.50
8	7/8	I-1/4	62.25
8	15/16	I-1/4	63.85
10	1/4	I-1/2	87.85
10	5/16	I-1/2	88.90
10	3/8	I-1/2	83.75
10	1/2	I-1/2	92.50
10	5/8	I-1/2	105.35
10	3/4	I-1/2	121.50
10	7/8	I-1/2	131.95
10	I	I-1/2	136.70
12	1/2	I-1/2	153.95
12	5/8	I-1/2	169.75
12	3/4	I-1/2	174.35
12	7/8	I-1/2	220.10
12	I	I-1/2	236.60

STAGGERED TOOTH SIDE MILLING CUTTERS

Precision made in U.S.A.

**IN STOCK FOR
IMMEDIATE
DELIVERY!**



DIAM- ETER	WIDTH OF FACE	SIZE OF HOLE	PRICE EACH
5	1/4	I-1/4	20.95
5	5/16	I-1/4	21.85
5	3/8	I-1/4	23.20
5	5/16	I-1/4	30.80
6	7/16	I-1/4	31.85
6	9/16	I-1/4	36.70
6	11/16	I-1/4	40.05
6	13/16	I-1/4	42.15
6	15/16	I-1/4	44.55
6	5/16	I-1/4	63.20
8	7/16	I-1/4	66.80
8	9/16	I-1/4	70.55
8	11/16	I-1/2	75.65
8	13/16	I-1/2	79.35
8	7/8	I-1/2	83.25
8	I	I-1/2	87.35
10	1/4	I-1/2	87.80
10	5/16	I-1/2	89.10
10	3/8	I-1/2	96.15
10	7/16	I-1/2	95.70
10	1/2	I-1/2	99.75
10	9/16	I-1/2	110.85
10	5/8	I-1/2	113.10
10	3/4	I-1/2	129.95
10	7/8	I-1/2	133.30
10	I	I-1/2	139.20
12	1/2	I-1/2	160.45
12	5/8	I-1/2	170.95
12	3/4	I-1/2	181.45
12	7/8	I-1/2	221.65
12	I	I-1/2	238.65

DEALER INQUIRIES INVITED

If you are a user of cutting tools it will pay you to be on our mailing list. We also stock special and standard sizes in slitting saws, end mills, etc. Write for circular now to Dept. B.

SID TOOL COMPANY, INC.

Cutting Tool Specialists

158 LAFAYETTE ST., NEW YORK 13, N. Y.

Telephone: BEekman 3-4270

INDEX TO ADVERTISERS

MACHINE AND TOOL

blue book

A

Aaron Machinery Company	35-47
Abart Gear and Machine Company	273
Acme Broach Corporation	32
Acme Danneman Company, Inc. (Danneman Die Set Division)	305
Acme Tool Co.	252
Adamas Carbide Corporation	29
Aget Manufacturing Company	279
Allegheny Ludlum Steel Corporation	28
Allen Industries, Alva	276
Allied Products Corporation (Richard Bros. Punch Div.)	59
American Chain & Cable Company (Wilson Mechanical Instrument Division)	259
American Drill Bushing Company	7
American LIP Corporation	317
American Saw & Manufacturing Company	32-C
Ames Company, B. C.	144
Amidon Engineering Company	319
Anderson Brothers Mfg. Company	302
Armstrong-Elum Mfg. Co. Inside Front Cover	
Armstrong Brothers Tool Company	4
Atlas Press Company (Clousing Division)	54
Atrax Company	40
Auto Moulding and Manufacturing Co.	291

B

Babcock & Wilcox Company	163
Bald Eagle Corporation	251
Baldor Electric Company	269
Barker Engineering Company	291
Bath & Company Inc., John	16-17
Bathie Manufacturing Company	293
Benco Collet Mfg. Company	Back Cover
Besly-Welles Corporation	160
Beverly Shear Mfg. Company	250
Bischoff Chemical Corporation	64
Blanchard Machine Company	58
Boice-Crane Company	96
Bridgport Machines Incorporated	44
Brighton Screw & Mfg. Company	86
Brown Corporation, W. R.	262
Buckeye Tools Corporation	215
Burg Tool Mfg. Co., Inc.	12

C

Carlton Machine Tool Company	25
Carroll Dividing Head Company	300
Carter Products Company	272
Chandler Tool Company	301

Chicago Gear Works	303
Chicago Quadriil Company	178
Chicago Tool & Engrg. Company	148
Cincinnati Gilbert Machine Tool Company	30
Cincinnati Lathe & Tool Company	41
Cincinnati Milling Machine Co.	8-9
Cincinnati Milling Machine Company (Products Division)	237
Cincinnati Shaper Company	27
Clark Instrument Incorporated	171
Clearing Machine Corporation	266
Cleveland Crane & Engrg. Company	82
Cleveland Punch & Shear Works Co.	70
Collis Company	308
Commander Manufacturing Company	287
Conant Broach Company	300
Conway Clutch Company	323
Cook Incorporated, Lawrence H.	240
Craley & Son, A. B.	245
Cross Company	48-49
Crownshield-Harris Co.	299
Crucible Steel Company of America	243
Cushman Chuck Company	32A

D

Danneman Die Set Division (Acme Danneman Company)	305
Darwin & Milner Incorporated	94
Dayton Rogers Manufacturing Company	258
Dearborn Gage Company	22
(Ellstrom Standards Division)	
Delta Power Tool Division	193-204
(Rockwell Manufacturing Company)	
Denison Manufacturing Company, R. B.	251
Detroit Broach & Machine Company	38-39
Detroit Flame Hardening Company	74
Detroit Power Screwdriver Company	168
DeVlieg Microbore Division	154
(DeVlieg Machine Company)	
DeWitt Equipment Corp.	241
DoAll Company	69
Donovan Manufacturing Company	275
Dreis & Krump Manufacturing Company	184
Dykem Company	277

E

Eclipse Counterbore Company	98
Economy Engineering Company	97
Eisler Engineering Company, Inc.	149
Elgin National Watch Company	280
Essex Rotary File & Tool Corporation	252

Etco Tool & Machine Company	62
Ex-Cell-O Corporation	53

Jones & Lamson Machine Company	75
--------------------------------------	----

F

Federal Press Company	179
Federal Products Corporation	2
Fen Machine Company	281
Fenway Machine Company	278
Ferracute Machine Company	329
Flascher Machine Company	236
Fulmer Company, C. Allen	32-D
Futurmill, Incorporated	43
(Detroit Milling Cutter Division)	

G

Gallmeyer & Livingston Company	332
Gatco Rotary Bushings	300
George Machinery Company, James W. 180-244	
Gisholt Machine Company	66-67
Glover Manufacturing Company	293
Goddard & Goddard Company	131
Grant Manufacturing & Machine Co.	245
Graphic Systems	174
Greaves Machine Tool Div.	33
(J. A. Fay & Egan Co.)	
Greenard Arbor Press Company	228
Greenlee Brothers & Company	76
Grob, Inc.	253

H

Hallock Company, F.	254
Hamilton Tool Company	113-115-117
Hammond Machinery Builders	251-257
Hanlo Gage Company	183
Harding Brothers, Inc.	3
Hartig Manufacturing Corporation	21
Hartmann Mfg. Company	292
Haskins Company, R. G.	85
Heller Tool Company	55
Hendley and Whittemore Company	240
Herman Stone Company	227
Himoff Machine Company	238
Hoggson & Pettis Mfg. Company	224
Hones Incorporated, Charles A.	285
Horowitz Monument Works, Benjamin	310
Houston Grinding & Mfg. Company	260
Howald Machine Works, W. T.	304

I

Illinois Metal Products	268
Industrial Filtration Company	57
Industrial Products Suppliers	319

J

Jaco Devices, Inc.	311
Jarvis Corporation	36
Johnson & Sons Incorporated, S. C.	128-B-C
Johnson Manufacturing Corporation	282

K

Kalins & Company, J. M.	152
Kasson Die and Motor Corp.	167
Kearney & Trecker Corporation	80-81
Kent Machine Company	313
Kennametal Incorporated	24
Keo Cutters	306
Kidde Precision Tool Corporation	245-304
Kitzman Manufacturing Company	301
Kling Brothers Engineering Works	60

L

Lakeshore Products	319
Lamina Dies & Tools, Inc.	89
Landis Machine Company	91
Lassy Tool Company	219-255
Linley Brothers Company	290
Lucas & Son, Inc., J. L.	303

M

MBI Export & Import Ltd.	320
Madison Tool Publications	319
Madison-Kipp Corporation	175
Manhattan Rubber Division	20
(Raybestos-Manhattan Inc.)	
Manhattan Supply Company	257
Maserati Corporation of America	77-226
Metal Carbides Corporation	172
Metallizing Engineering Company	101
Michigan Chrome & Chemical Company	223
Midwest Tool & Engineering Company	225
Miller Fluid Power	264
(Flick-Reedy Corporation)	
Milne & Company, A.	Inside Back Cover
Morrison Company, D. C.	293
Morse Twist Drill & Machine Company	18-19
Moyle & Merryweather Machinery Co.	34
Mummert-Dixon Company	255

N

National Acme Company	150-151
National Broach & Machine Company	190
National Twist Drill & Tool Company	195
Nebel Machine Tool Corp.	11
(Smith & Mills Shaper Div.)	
Neise, Karl A.	268-276-296
Neico Tool Company, Inc.	267
Nichols-Morris Corporation	217
Nicholson File Company	209
Nielsen, Incorporated	272
Nirol Mfg. Company	253
Norgren Company, C. A.	63
Norton Company	51

O

Oliver Instrument Company	31
O'Neil-Irwin Manufacturing Company	159

BOX TYPE RAM

BAR TYPE RAM KNOCKOUT

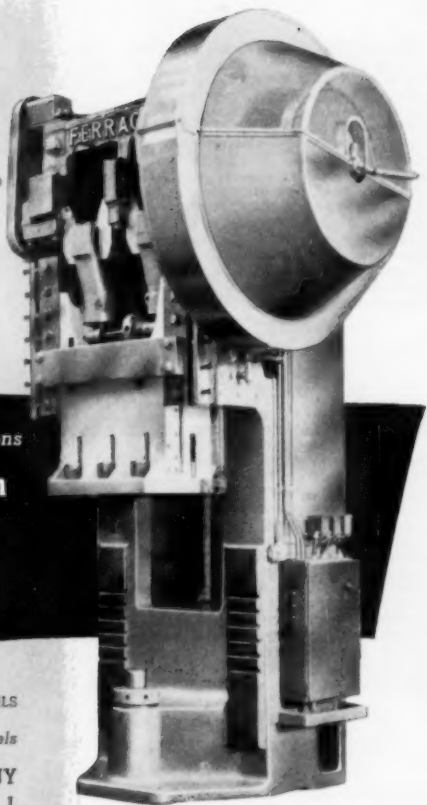
AIR RAM COUNTERBALANCE

AIR FRICTION CLUTCH WITH
MECHANICALLY-INTERCONNECTED
BRAKE

AUTOMATIC LUBRICATION

ADJUSTABLE, HINGED BED

HIGH TENSILE SEMI-STEEL
CAST FRAME



for all-around use in many applications

**FERRACUTE combination
ADJUSTABLE
BED & KNEE PRESS**

WRITE FOR COMPLETE DETAILS

Available in 75-ton to 200-ton models

FERRACUTE MACHINE COMPANY

East Commerce Street, Bridgeton, N. J.

*Since 1863, Manufacturers of Power Presses,
Press Brakes and Special Machinery*

FERRACUTE

CAG-200
200-ton model
with bed removed

Use postpaid card. Circle No. 486

Opto-Metric Tools, Inc.	147
Oslund Precision Products	295

P

Peaslee Metal Products Company	256
Pekay Abrasives	153
Penniman, Elisha	319
Pines Engineering Company, Inc.	92
Pipe Machinery Company	133
Plunket Machine Company, J. E.	290
Pope Machinery Corporation	26
Portage Double-Quick, Inc.	78
Pratt & Whitney Company	118-119-234-235
Prebco Bushing Company	291
Precise Products Corporation	270
Procurier Safety Chuck Company	239
Production Devices Incorporated	276
Product Machine Company	73
Pruett Corporation	13
Putnam Tool Company	23
Pyrometer Instrument Company	310

R

R and L Tools Incorporated	125
Raybestos-Manhattan, Inc. (Manhattan Rubber Division)	20
Reid Brothers Company, Incorporated	32-B
Reid Company, William	319
Rivets Company, J. A.	238
Rivett Lathe & Grinder Incorporated	165
Robbins Company, Omer E.	50
Rockford Die & Tool Works	191
Rockford Machine Tool Company	212-213
Rodgers Hydraulic Incorporated	157
Roll Feeds Corporation	154
Ross Equipment Company	309
Rothfuss Tool Company	146
Rouse & Company, H. B.	189
Royal Master, Inc.	95
Ruthman Machinery Company	242
Ryerson and Son, Incorporated, Joseph T.	102

S

S & S Machinery Co.	315
Sales Service Machine Tool Company	229
Schauer Mfg. Corporation	271
Scherr Company, Inc., George	311
Schmidt, Inc., George T.	305
Schonerberger, Fred H.	298
Severance Tool Industries	176
Sheldon Machine Company	206
Sid Tool Company	326
Simonds Saw & Steel Company	61
Smith & Mills Shaper Div. (Nebel Machine Tool Corp.)	11
Somerset Tool Company	275
Spellman Company, R. L.	301
Sperman Metal Specialties	283
Spitfire Tool Company	216
Standard Electrical Tool Company	331
Standard Horse Nail Corporation	261
Standard Pressed Steel Company	123, 220-221
Stevens Company, John B.	256
Stewart-Warner Corporation	263

Stone Machinery Company	249
Sturtevant Company, P. A.	245
Sundstrand Machine Tool Company	218
Sunnen Products Company	1
Sun Oil Company	14-15
Syntroon Company	211

T

Tamms Industries, Incorporated	305
Thomas Hoist Company	297
Thomson Industries Incorporated	71
Threadwell Tap & Die Company	65
Thriftmaster Products Corporation	254
Tools, Incorporated	306
Torit Manufacturing Co.	173
Townsend Mfg. Company, H. B.	230
Transmears Corporation	180
Tree Tool and Die Works	10
Troyke Mfg. Company	306
Tru-Seal Division (Flick-Reedy Corporation)	265

U

U. S. Drill Head Company	177
U. S. Tool Company	46

V

Van Keuren Company	68
Van Norman Machine Company	231
Verson All Steel Press Company	52
Victor Machinery Exchange, Inc.	307
Vimco Mfg. Company	222
Vogel Tool & Die Corporation	288
Vulcan Tool Company	128-D

W

Walker Company, O. S.	56
Walls Sales Corporation	273
Ward Thread Grinding Company	305
Wardwell Manufacturing Company	284
Warner & Swasey Company	128-A
Watts Brothers Tool Works	240
Wells & Sons, W. F.	242
West Disinfecting Company	187
West Point Mfg. Company	93
Wetmore Tool & Engineering Company	304
Whitman & Barnes	45
Whitney Metal Tool Company	289
Williams & Company, J. H.	37
Wilson Air Collet Closer Inc.	254
Winter Brothers Company	134
Woods Machine Company, S. A.	72
Woodworth Company, N. A.	247

Y

Yoder Company	42
Yohe Supply Company	296
Yost Mfg. Company	291

STANDARD HEAVY DUTY SUPER PRECISION SPINDLES

*"Masters of
Milling"*



No.
6027 MY

No.
6009 M

AMERICA'S
MOST EXTENSIVE
LINE OF
MILLING SPINDLES!

From 1 to 200 HP with standard tapers, #20 to #60. To satisfy every milling demand — enclosed, totally enclosed fan-cooled, high cycle and liquid-cooled. Motorized or Belt-Driven. Variable, single or multiple speed motor — Speed to suit your application.

A milling spindle for every purpose . . . and more than that . . . a milling spindle reflecting in its SUPER CAPACITY AND TROUBLE FREE OPERATION the four decades of its maker's experience in spindle manufacturing. And "special problems"? . . . get the answer from Standard experts!

FOR COMPLETE SPECIFICATIONS AND DIMENSION DRAWINGS
OF MORE THAN 75 MILLING SPINDLES, WRITE TODAY!

SUPER PRECISION SPINDLE DIVISION

the **STANDARD** electrical tool co. SINCE 1912

STANDARD SETS THE PACE!



2486 RIVER ROAD • CINCINNATI 4, • OHIO

Use postpaid card. Circle No. 487

FOUND WHERE AIRCRAFT POWER AND CONTROLS TAKE SHAPE

GRAND RAPIDS GRINDERS

Bendix

BENDIX PRODUCTS
DIVISION
BENDIX AVIATION
CORP.



FAIRCHILD ENGINE
DIVISION
FAIRCHILD ENGINE
AND AIRPLANE CORP.



FORD INSTRUMENT
COMPANY
DIVISION OF
SPERRY RAND CORP.



HAMILTON
STANDARD DIVISION
UNITED AIRCRAFT
CORP.



LEAS, INCORPORATED



ORENDA ENGINES
LIMITED



PRATT & WHITNEY
AIRCRAFT
DIVISION OF UNITED
AIRCRAFT CORP.



WRIGHT
AERONAUTICAL
DIVISION
CURTIS-WRIGHT
CORP.

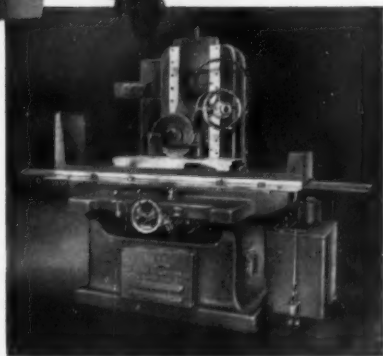
**GALLMEYER
& LIVINGSTON**

Precision is paramount in the manufacture of components for aircraft power and control. That's why these makers of precision parts have Grand Rapids Grinders in their toolrooms—for the utmost in precision grinding.

Model No. 55, for example, features one-piece column and base for permanent vibrationless rigidity. Longitudinal travel table and cross feed are hydraulically actuated. Wheel head has powered rapid vertical travel. And it's faster than any other grinder of this type and size . . . with variable table speed up to 125 fpm.

With these built-in precision features typical of all Grand Rapids Grinders, it's no wonder they're found in leading toolrooms.

A note on your letterhead will bring full details.



GRAND RAPIDS No. 55 HYDRAULIC FEED SURFACE GRINDER. Table speed up to 125 fpm. Working surface of table is 42" x 36". Vertical movement of wheel head is 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1925 and 2500 rpm.

SUPER SABRE F-100
NORTH AMERICAN
AVIATION, INC.

GALLMEYER & LIVINGSTON COMPANY

405 Straight Ave., S.W., Grand Rapids, Michigan

Use postpaid card. Circle No. 488

January, 1957 For free information . . . use these postage-free Action Cards

Free Literature circle key numbers

1	11	21	31	41	51	61	71
2	12	22	32	42	52	62	72
3	13	23	33	43	53	63	73
4	14	24	34	44	54	64	74
5	15	25	35	45	55	65	75
6	16	26	36	46	56	66	76
7	17	27	37	47	57	67	77
8	18	28	38	48	58	68	78
9	19	29	39	49	59	69	79
10	20	30	40	50	60	70	80

New Products

circle key numbers

81	91	101	111	121	131	141	151	161	171
82	92	102	112	122	132	142	152	162	172
83	93	103	113	123	133	143	153	163	173
84	94	104	114	124	134	144	154	164	174
85	95	105	115	125	135	145	155	165	175
86	96	106	116	126	136	146	156	166	176
87	97	107	117	127	137	147	157	167	177
88	98	108	118	128	138	148	158	168	178
89	99	109	119	129	139	149	159	169	179
90	100	110	120	130	140	150	160	170	180

Company.....

Name..... Position.....

Street.....

City..... Zone..... State.....

January, 1957 For free information . . . use these postage-free Action Cards

Advertisements

circle key numbers

201	226	251	276	301	326	351	376	401	426	451	476	501	526	551	576
202	227	252	277	302	327	352	377	402	427	452	477	502	527	552	577
203	228	253	278	303	328	353	378	403	428	453	478	503	528	553	578
204	229	254	279	304	329	354	379	404	429	454	479	504	529	554	579
205	230	255	280	305	330	355	380	405	430	455	480	505	530	555	580
206	231	256	281	306	331	356	381	406	431	456	481	506	531	556	581
207	232	257	282	307	332	357	382	407	432	457	482	507	532	557	582
208	233	258	283	308	333	358	383	408	433	458	483	508	533	558	583
209	234	259	284	309	334	359	384	409	434	459	484	509	534	559	584
210	235	260	285	310	335	360	385	410	435	460	485	510	535	560	585
211	236	261	286	311	336	361	386	411	436	461	486	511	536	561	586
212	237	262	287	312	337	362	387	412	437	462	487	512	537	562	587
213	238	263	288	313	338	363	388	413	438	463	488	513	538	563	588
214	239	264	289	314	339	364	389	414	439	464	489	514	539	564	589
215	240	265	290	315	340	365	390	415	440	465	490	515	540	565	590
216	241	266	291	316	341	366	391	416	441	466	491	516	541	566	591
217	242	267	292	317	342	367	392	417	442	467	492	517	542	567	592
218	243	268	293	318	343	368	393	418	443	468	493	518	543	568	593
219	244	269	294	319	344	369	394	419	444	469	494	519	544	569	594
220	245	270	295	320	345	370	395	420	445	470	495	520	545	570	595
221	246	271	296	321	346	371	396	421	446	471	496	521	546	571	596
222	247	272	297	322	347	372	397	422	447	472	497	522	547	572	597
223	248	273	298	323	348	373	398	423	448	473	498	523	548	573	598
224	249	274	299	324	349	374	399	424	449	474	499	524	549	574	599
225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600

Inside Front Cover Inside Back Cover Back Cover
Inserts: 1A 1B 1C 1D 2A 2B 2C 2D 3A 3B 3C 3D

Company.....

Name..... Position.....

Street.....

City..... Zone..... State.....

FIRST CLASS
PERMIT NO. 272
WHEATON, ILLINOIS

BUSINESS REPLY CARD
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3c POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION

WHEATON, ILLINOIS

FIRST CLASS
PERMIT NO. 272
WHEATON, ILLINOIS

BUSINESS REPLY CARD
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3c POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION

WHEATON, ILLINOIS

*Across
North
America*

MILNE

**The Most Helpful Name
In Tool Steel**

Milne has built its reputation on *tool steel* knowledge and service. By concentrating on *tool steel only*, Milne has become America's *Leading Tool Steel Specialist*... an authoritative source of answers to your tool steel problems.

- Milne stocks a tremendous range of grades, sizes, shapes and finishes and keeps on introducing new, specialized steels.
- Every Milne sales-engineer is an experienced expert who can help pin-point the right steel for the job.
- From experience, Milne knows the importance of "Rush Delivery" on a tool steel order, whether it's in pounds or tons.
- Milne's continent-wide network of warehouses, sales offices and representatives puts a Milne expert and a Milne stock near you.
- All Milne steels are full length Kolorkoted for permanent identification.

Write or call for Milne's latest
Tool Steel Selector Chart.

A MILNE & CO. INC.
Established 1881
743 WASHINGTON ST. NEW YORK 14 N.Y.
Representatives of Tool Steel Specialists
in all parts of the U.S. and Canada and abroad

Wide range of
grades and sizes in

- WATER HARDENING • NON DEFORMING
- SHOCK RESISTING • GRAPHITIC
- HOT WORK AND HIGH SPEED • TOOL STEELS

WAREHOUSES:

New York • Chicago • Boston • Pittsburgh • San Francisco • Cleveland • Philadelphia • Detroit • Dayton • Atlanta • New Britain, Conn. • St. Louis

SALES OFFICES:

Rochester • Louisville • Worcester • Milwaukee • Madeira Beach, Florida • Phoenix • Indianapolis • Charlotte

SALES AGENTS

Taywood Steel Products Bell, Los Angeles
Pacific Machinery & Tool
Steel Co. Portland, Oregon
Maxwell Steel Co., Inc. Fort Worth, Texas
Geoffroy-Lane, Inc. Denver
Sanderson-Newbold Ltd. Montreal—Toronto

Complete Line of Tool Steels... Solid • Hollow • Flat Ground



You don't need to clean your spindles
or draw tubes for over a year
when you use...

BENCO COLLETS

— with the "O" ring seal —

The above statement is true! We've proved it in our own plant, where the conditions and machines are much the same as in any shop today. The simple little "O" ring seal in the Benco Collet is the most efficient method ever discovered for preventing dirt and chips from getting between the draw tube and spindle wall, and into the actuating mechanism at the end of the spindle. It's a money saver and time saver every day and the collets with the "O" ring seal cost you no more than ordinary collets.

This is only one outstanding feature of the Benco line of Solid and Master Collets. Benco precision collet manufacturing methods applied to selected alloy steel, followed by careful heat treating and rigid inspection guarantee better production from your machines.

Benco Collets are stocked in a large range of sizes for all popular makes of automatics. Select them every time...you just can't get better quality, performance or value!

Write for new catalog.

BENCO

COLLET MANUFACTURING CO.

Cleveland 14, Ohio

